

Risk Factors of the Elderly Falling in Public Hospitals: A Systematic Review Study

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Abstract

Background: Falls are the most common and problematic issue of old age. There is the possibility of falls among the elderly in the hospitals. The present study was conducted to determine the risk factors for falls in the elderly in hospitals through systematic review.

Method: This is a systematic review based on the PRISMA protocol. The IranMedex, SID, Magiran, IranDoc, Medlib, Pubmed, Scopus, Web of Science, Science Direct, Medline and Google Scholar databases were searched for keywords in the time frame of 1994-2017.

Results: The mean age was 64-81 years old and the number of elderly people varied from 88 to 28524 people. Of these studies, six studies were performed in the acute care unit, three studies in the elderly care unit, three studies in the surgical and clinical department, one study in the rehabilitation department, one study in the psychiatric department and other studies were performed in several parts of the hospital. The results of this study referred to individual and external factors as risk factors for the falls in the elderly in the hospital. The use of medications, physical problems, and psychological problems were the most common risk factors for falls in the elderly.

Conclusion: In acute care, chronic care, psychiatric care, and elderly care units, there are many risk factors for the falls in the elderly due to their physical and mental status. Identifying and resolving these risk factors may provide safety for the elderly.

Keywords: Risk Factors; Accidental Falls; Aged; Hospitals; Systematic Review.

Introduction

Elderly is a stage of life influencing a person's biological, mental, and physical status ⁽¹⁾. Enhancing the quality of medical care is one of the main concerns on the part of healthcare professionals. A major goal of a healthcare organization can be the prevention of any harm to patients and avoiding endangering patients' safety following providing healthcare for them ⁽²⁾. Diseases that threaten this group include diabetes and hemodialysis^(3,4).

There are many types of trauma, including vascular trauma, accidents, and falls⁽⁵⁻⁷⁾. Falling often put people over 65 at risk influencing their economic, social, and psychological status such as losing the sense of independence and self-assurance. These can, in turn, ensue negative effects which may culminate in fracture

or even their death ⁽⁸⁾. Moreover, these factors can make the elderly vulnerable to various complications including fracture, destruction of soft tissues, bruises, and subdural hematoma ⁽⁹⁾. Falling can also have different physical consequences (such as hip fracture, disablement, and inability to move) and mental consequences (including losing one's self-confidence, self-esteem, and lowering of life expectancy) ⁽¹⁰⁾. It ought to be noted that falling not only influences the patients' lives, but also it may lead to the prolonging of hospitalization period as well as healthcare expenses in medical care system ⁽¹¹⁾.

The major risk factors affecting falling are categorized into four groups: 1) biological factors such as age, gender, diseases, cognitive disabilities; 2) socio-economic factors including literacy, income, housing, public health, and social seclusion; 3) behavioral factors

such as fear of falling, life style, concomitant taking of medications, doing no exercise, and unsuitable clothing; 4) environmental factors like building planning, stairs, slippery halls and floors, carpets, floorings, fences, and bathroom^(12, 13). One of the tasks of nurses is to improve patients' health⁽¹⁴⁾. The current study seeks to identify risk factors for the elderly falling in hospitals through a systematic review method.

Material and Method

The present study is a systematic review which attempts to examine risk factors underlying the elderly falls in hospitals around the world. In this study PRISMA protocol, which is especially designed for systematic reviews and meta-analytic studies, has been used.

In order to reach the intended studies, English data bases including Science Direct, PubMed, Scopus, Web of science, Medline along with Farsi data bases of SID, Magiran, Iranmedex, Irandoc, Medlib and Google Scholar search engine were searched within the interval of 1994 till 2017. The search was conducted drawing on key words of "Risk Factors; Accidental Falls; Aged; Hospitals; Systematic Review". AND/OR were used to secure sensitivity of the search.

The inclusion criteria were studies which focused on risk factors for the elderly falling in hospitals. The exclusion criteria comprised studies which drew on nonrandom sampling methods, no reporting of the requisite data such as the size of the population or risk factors affecting the elderly fall, unacceptable quality of studies according to STROB Checklist, and lack of access to studies full-texts.

The international and standardized checklist of STROB was used to qualitatively evaluate the studies. This checklist comprised 22 sections covering different parts of a report. Based on this checklist, articles that had acquired the minimum score of 16 could enter the extraction stage within systematic review procedure.

Two researchers carried out data gleaning independently in order to minimize any error or bias in data gathering procedures. Data collection form was used based on the study aims. Researchers entered the elicited data to a checklist which encompassed the following: researcher's name, title of the article, sample size, gender, age group, elderly falling risk factors, the year study conducted, and the country in which the study had been conducted. A third researcher examined

the gleaned data by the two researchers looking for any inconsistencies or discrepancies. After completing the form, the resulting data were examined, summarized, and finally reported.

Findings

The initial search yielded 982 research papers. In the next stage, their titles were analyzed by two members of the team independently and 335 articles with content overlapping were eliminated from the study. Then, the articles abstracts were examined and 38 research papers for which their full texts were not available were removed from the study. Afterwards, the remaining articles were scrutinized in terms of the inclusion/exclusion criteria. After the meticulous and exhaustive reviewing of the articles, 590 articles that did not conform to our exclusion criteria were removed from the study. Finally, the remaining research papers were analyzed drawing upon STROB checklist which ended up in the exclusion of three more articles. In the end, 16 articles entered the systematic review process.

Characteristics of articles entered Systematic Review Process:

In the Case study Salgado, R (12) (1994) in Australia with 128 elderly (ccu word) result showed Risk Factors fall is Disorientation, Taking medicines Evidence of CVA and Poor performance in "Get-up-and-go" Test.

In the study Luukinen, H (16) (1995) in 145 elderly (Prolonged cares in hospitals / nursing homes) result showed Dizziness, evidence of CVA Consequences, high blood pressure, using walking aids, taking antidepressants, Lowering of muscular strength, Lowering of pulse in Art spot test, And lowering of walking pace.

In the Cass-control study Salgado, R (17) (2003) in Australia with 88 elderly (ccu word) result showed Disorientation, Taking psychiatric Drugs, Evidence of CVA and Poor performance in "Get-up-and-go" Test.

In the study Ishizuka, MA (18) (2005) in Brazil with 49 elderly (Geriatric care) result showed Risk Factors fall is Depression, history of referring to psychiatrist, Muscular Dystrophy.

In the Retrospective study Bollini, G (19) (2010) in Australia with 112 elderly (ccu word) result showed Risk Factors fall is High blood pressure, 15 or higher on Norton Scale, over 10 days of hospitalization

In the Retrospective study Freidman, SM (20) (2008) in USA with 212 elderly (ccu word) result showed Risk Factors fall is Presence of the elderly In nursing homes.

In the Case-control study Chen, YC (21) (2009) in Taiwan with 202 elderly (All Wards) result showed Risk Factors fall is Leg dystrophy, Insomnia, Blood pressure fall, History of Falling in the last year, Recent use of hypnotics.

In the study Bollini, G (19) (2010) in Italy with elderly (8 wards) result showed Risk Factors fall is Taking one or combined drugs.

In the Retrospective/ Case control study Chen, XL (22) (2010) in China with 438 elderly (Geriatric) result showed Risk Factors fall is living in dormitory/ nursing homes before hospital admission, requiring assistance for movement, cognition disorder, CVA, urinary incontinence and arthritis/ osteoporosis.

In the Retrospective study Church, S (23)(2011) in USA with 9625 elderly (Surgery Wards) result showed Risk Factors fall is Delirium 43%, Disability 34%, External factors 13%, Other factors 10%.

In the Case-control study Chen, X (24)(2011) in Australia with 399 elderly (Geriatric) result showed Risk Factors fall is History of Anemia, CVA, Ventricular Fibrillation, Over 5 weeks hospitalization.

In the Retrospective study Maxwell, CA (25) (2013) in USA with 101 elderly (Surgery Wards) result showed Risk Factors fall is 36 patients (44%) had cognition disorders and 62 patients (78%) had performance disorder prior to their fall.

In the Case-control study Chan, CH (26) (2013) in USA with 290 elderly (Psychiatry Wards) result showed Bipolar Disorder, Psychiatric disorders, Manic episode, History of health problems Or fall in last 6 months.

In the Cohort study Jorgensen, TSH (27) (2015) in Denmark with 28524 elderly (All Wards) result showed People with dementia, osteoporosis, CVA, depression, COPD, and Parkinson.

In the Retrospective study Li, IF (28) (2016) in Taiwan with 244 elderly (Clinical, Oncology, Surgery word) result showed Dizziness and Leg dystrophy, taking medications such as tranquilizers, sleeping pills, blood pressure drugs, hypoglycemic, and diuretic drugs.

In the Descriptive-cross sectional study Moura, LA (5) (2017) in Brazil with 99 elderly (Clinical, Surgery) result showed High blood pressure, taking insulin, long walks.

Discussion

Systematic review studies provide comprehensive information^(29, 30). This study is the first systematic review study to evaluate the Risk Factors of Elderly Falling in Public Hospitals. The findings of the present study can be summarized into two important categories of factors underlying the elderly falls in hospitals: individual factors (physical, mental, cognitive) and external factors. Following a review study in 2013 in Iran, it was found that more than 30% of people over 65 experience falling at least once a year. Lowering of consciousness, convulsion, sudden myocardial infarction, and environmental problems were among the influential risk factors for the elderly falling⁽³¹⁾. In another review study on risk factors for the elderly falling in hospitals in Iran in 2013, the risk factors were mostly either individual or external⁽³²⁾. The results of another review study demonstrated that the major risk factors for the elderly fall comprised balance disorders, visual disorders, lowering of cognitive abilities especially problems of concentration and noticing along with other factors such as increasing of age, gender, dizziness, cardio-vascular diseases, dementia, depression, and taking medications⁽³³⁾.

In another study, the elderly people who used walking aids were more prone to falling than others since some of the elderly may not be able to use such aids properly⁽³⁴⁾. In the current study, it was mentioned that in studies by Luukinen and Aizen it had been demonstrated that the elderly who used walking aids (such as walkers, clubs, etc.) more often were more likely to fall in hospitals. Moreover, the relationship between taking drugs (especially Amphetamines, sedatives, antidepressants, diuretics, and cardio-vascular medications) and the elderly fall. It was also demonstrated that the elderly who take more than one drug are more likely to fall⁽³⁵⁾. It has also been claimed that antipsychotic medications, anti-arrhythmia, digoxin, diuretics, as well as tranquilizing medicines increase the risk of the elderly falling in hospitals⁽³⁶⁾.

Conclusion

In CCU, prolonged care, psychiatry, and geriatric wards in hospitals there are different factors contributing

to the elderly fall, depending on their physical and mental states. Thus, identifying and eliminating these risk factors can guarantee more safety for the elderly.

Conflict of Interest: There is no conflict of interest between authors.

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References

- Sarokhani D, Parvareh M, Hasanpour-Dehkordi A, Sayehmiri K, Moghimbeigi A. Prevalence of Depression among Iranian Elderly: Systematic Review and Meta-analysis. *Iran J Psychiatry*. 2018;13(1):55-64.
- Health OW. Conceptual framework for the international classification for patient safety version 2009. 2009:1-154.
- Mohammadi M, Raieghi AAV, Jalali R, Ghobadi A, Salari NJRiE, Disorders M. The prevalence of retinopathy among type 2 diabetic patients in Iran: A systematic review and meta-analysis. 2019;20(1):79-88.
- Mohammadi MM, Raygani AAV, Ghobadi A, Samadzadeh S, Salari NJCm, research. Effect of near-infrared light therapy based on acupoints on the severity of restless legs syndrome in patients undergoing hemodialysis: a single-blind, randomized controlled trial. 2018;16(1-2):1-8.
- Moura L, Araújo J, Fernandes A, de Carvalho R, da Silva H, Santos V, et al. Risk factors of falls in elderly in hospital environment. *vista Cubana de Enfermeria*. 2017;33(3).
- Xu Y, Shanthosh J, Zhou Z, Somerville E, Anderson CS, Glozier N, et al. Prevalence of driving and traffic accidents among people with seizures: a systematic review. 2019:1-12.
- Karimyan M. Prevalence of vascular trauma and related complications in Iran : A Systematic Review and Meta-Analysis. *Trauma Monthly*. 2020.
- Shumway-Cook A, Brauer S, Woollacott M. Predicting the probability for falls in community-dwelling older adults using the Timed Up & Go Test. *Phys Ther*. 2000;80(9):896-903.
- van Haastregt J, van Rossum E, Diederiks J, Voorhoeve P, de Witte L, Crebolder H. Preventing falls and mobility problems in community-dwelling elders: The process of creating a new intervention. *Geriatr Nurs*. 2000;21(6):309-14.
- Maghfouri B, Hassani mehraban A, Taghizade G, Aminian G, Jafari H. Validity and reliability of persion version of home falls and accident screening tool in iranian elderly (persian). *modern rehabilitation*. 2012;5(4):9-14.
- Tinetti M, Kumar C. The patient who falls: "It's always a trade-off". *JAMA*. 2010;303(3):258-66.
- Orces C. Prevalence and Determinants of Fall-Related Injuries among Older Adults in Ecuador. *Curr Gerontol Geriatr Res*. 2014:1-7.
- von Heideken Wagert P, Gustafson Y, Kallin K, Jensen J, Lundin-Olsson L. Falls in very old people: the population-based Umea 85+ study in Sweden. *Arch Gerontol Geriatr*. 2009;49(3):390-6.
- Dalvandi A, Vaisi-Raygani A, Nourozi K, Ebadi A, Rahgozar MJOaMjoms. The Importance and Extent of Providing Compassionate Nursing Care from The Viewpoint of Patients Hospitalized in Educational Hospitals in Kermanshah-Iran 2017. 2019;7(6):1047.
- Salgado R, Lord S, Packer J, Ehrlich F. Factors associated with falling in elderly hospital patients. *Gerontology*. 1994;40(6):325-31.
- Luukinen H, Koski K, Laippala P, Kivela S-L. Risk Factors for Recurrent Falls in the Elderly in Long-term Institutional Care. *Public Health*. 1995;109(1):57-65.
- Salgado R, Lord S, Ehrlich F, Janji N, Rahman A. Predictors of falling in elderly hospital patients. *Arch Gerontol Geriatr*. 2004;38(3):213-9.
- Ishizuka M, Mutarelli E, Yamaguchi A, Filho W. FALLS BY ELDERS WITH MODERATE LEVELS OF MOVEMENT FUNCTIONALITY. *CLINICS*. 2005;60(1):41-6.
- Bollini G, Lolli A, Cattin P, Zampieri P, Lamberti M. Falls of patients in hospital: testing of a notification system and statistical monitoring. *Prof Inferm*. 2010;63(1):9-14.
- Friedman S, Mendelson D, Bingham K, McCann R. Hazards of Hospitalization: Residence Prior to

- Admission Predicts Outcomes. *The Gerontologist*. 2008;47(4):537-41.
21. Chen Y, Chien S, Chen L. Risk factors associated with falls among Chinese hospital inpatients in Taiwan. *Archives of Gerontology and Geriatrics*. 2009;48(2):132-6.
 22. Chen X, Liu Y, Chan D, Shen Q, Van Nguyen H. Characteristics associated with falls among the elderly within aged care wards in a tertiary hospital: a retrospective. *Chin Med J (Engl)*. 2010;123(13):1668-72.
 23. Church S, Robinson T, Angles E, Tran Z, Wallace J. Postoperative falls in the acute hospital setting: characteristics, risk factors, and outcomes in males. *The American Journal of Surgery*. 2011;201(2):197-202.
 24. Chen X, Van Nguyen H, Shen Q, Chan D. Characteristics associated with recurrent falls among the elderly within aged-care wards in a tertiary hospital: The effect of cognitive impairment. *Archives of Gerontology and Geriatrics*. 2011;53(2):183-6.
 25. Maxwell C. Screening hospitalized injured older adults for cognitive impairment and pre-injury functional impairment. *Applied Nursing Research*. 2013;26(3):146-50.
 26. Chan C, Gau S, Chan H, Tsai Y, Chiu C, Wang S, et al. Risk factors for falling in psychiatric inpatients: A prospective, matched case-control study. *Journal of Psychiatric Research*. 2013;47(8):1088-94.
 27. Jørgensen T, Hansen A, Sahlberg M, Gislason G, Torp-Pedersen C, Andersson C, et al. Nationwide time trends and risk factors for in-hospital falls-related major injuries. *Int J Clin Pract*. 2015;69:703-9.
 28. Li I, Hsiung Y, Hsing H, Lee M, Chang T, Huang M. Elderly Taiwanese's Intrinsic Risk Factors for Fall-related Injuries. *International Journal of Gerontology*. 2016;10(3):137-41.
 29. Karimian M. The effect of Angipars on wound healing in patients with diabetes: A systematic review. *journal of diabetis*. 2020.
 30. Khalighi E. Knowledge, Attitudes and Barriers Pain Management by Nurses in Iran: Systematic Review. *Anaesthesia, Pain & Intensive Care*. 2019;24(4):793-802.
 31. Golmakani E, Usefi M, Tabatabaeichehr M, Ghanei zare F, Moayyed L, Hasan zadeh E, et al. Fall In Elderly : A Literature Review. *Journal of North Khorasan University of Medical Sciences* 2013;5:1159-63.
 32. Valizadeh L, Zabihi A. Risk Factors for Falling among Hospital Inpatients. *J Babol Univ Med Sci*. 2014;16(1):75-84.
 33. Ambrose A, Paul G, Hausdorff J. Risk factors for falls among older adults: A review of the literature. *Maturitas*. 2013;75(1):51-61.
 34. Luxton T, Riglin J. Prevention falls in older people: a multi-agency approach. *Nursing older people*. 2003;15(2):18-21.
 35. Theodos P. Fall prevention in frail Elderly nursing Home residents, A challenge case management; part 1. *Prof Case Manag*. 2003;8(6):245-51.
 36. Nevitt M, Cummings S, Kidd S, Black D. Risk factors for recurrent nonsyncopal falls. A prospective study. *JAMA*. 1989;261(18):2663-8.