

# Protocol of Identification of Effective Factors in Reducing Fall among the Hospitalized Patients: A Systematic Review

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## Abstract

**Background:** The patient's fall is one of the factors threatening the patient's health in hospitals and medical centers. More than 12% of patients fall once during the hospitalization period, which in some cases leads to disability or death. Therefore, falling prevention is one of the essential issues in the hospital and requires interventions. **Objectives:** The aim of this study was to examine the effective factors in controlling the hurts caused by patient fall. **Methods:** This study was conducted to present a protocol for identifying the effective factors of patient fall in hospitals. For this purpose, four international databases were investigated and searched, in two phases (databases are Scopus, PubMed, Web of Science, and ScienceDirect, along with Google Scholar). First, we selected and categorized the articles, using PRISMA instruction for systematic review studies. In the second phase, the findings were analyzed using thematic analysis; then, categories and subcategories were extracted. To examine the quality of studies, critical appraisal skills program, Newcastle–Ottawa Scale, and Strengthening the Reporting of Observational Studies in Epidemiology checklists were applied. **Systematic Review Registration:** PROSPERO CRD42020161328. **Ethics and Dissemination:** There is no human participation in the study, and after data analysis, the author prepared an article for a specialized journal. Permission to the study was obtained from the ethics committee of the Faculty of Health and Safety, affiliated to Shahid Beheshti University of Medical Sciences.

**Keywords:** Fall, hospital, hospitalization, patient, prevention

## INTRODUCTION

Hospital plays a key role in providing health and treatment services and reducing of hurts.<sup>[1]</sup> Patient fall in hospital is a common and serious issue for patients, their families, and for the health system. The incident may lead to injuries, disabilities and even death.<sup>[2,3]</sup> According to the WHO, fall is an unintentional event that leads to fall of patient on the ground or on a lower surface. According to the national database of nursing quality indicators, fall is defined tumbling on the ground with or without injuries.<sup>[4]</sup> The prevalence of fall differs in various parts of the world, so that a review study reported the rate between 2.2% and 25%.<sup>[2,3,5]</sup> There are different factors in the increase of patients' fall in hospitals. There are also different approaches to control patient fall and each approach

emphasizes on specific principles and rules, to reduce patient fall cases.<sup>[6-9]</sup>

Falling among hospitalized patients is a repeatable process that can lead to adverse physical and psychological consequences, including injuries, disabilities, increased hospitalization period, fear of fall, stress, anxiety, depression, and decrease

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of physical activities, and in some cases death. These have negative effects on the quality of life, specifically if they need care from family members or health-care providers, they are more likely to develop emotional reactions that can affect a person's independence and rehabilitation.<sup>[5,10-13]</sup>

After nationwide implementation of the clinical domination plan by the *Ministry of Health, Treatment, and Medical Education* in Iran, the patient safety became the key concern in health centers. According to this plan, risk management and improvement of patient safety in health centers are the main measures for clinical creditability.<sup>[14]</sup> Since patient fall in hospitals is a major risk to health services efficiency, it is imperative to predict and prevent the incidents and provide equipment to control mortality, injuries, and disabilities.

Since identification of the effective factors in controlling patient fall is one of the safety criteria, the results of the study can be used for determining the strategies and adjusting therapeutic processes in national health system to control falls, injuries, as well as to improve health in the society.

## Objective

The aim of this study was to identify the effective factors in decreasing the patient fall incidences in hospitals and to determine patient fall prevention strategies.

## METHODS

### Protocol design

The present study was a systematic review to find and categorize the related articles, based on the PRISMA instruction.<sup>[15]</sup> Afterward, the findings were organized as categories and subcategories using a thematic analysis. The whole research process including the search, selection of articles, quality assessment, and data extraction was performed by three experienced researchers.

### Eligibility criteria

The author searched and considered all descriptive, analytical, and qualitative studies, based on inclusion criteria with no time limitation. Our pilot search showed that studies published after 1990 meet the criteria and methodology conditions.

### Search strategy and information sources

Two independent researchers investigated the articles. This systematic review relies on different sources including PubMed, Scopus, Web of Science, ScienceDirect databases, and Google Scholar web search, as well as the key journals (based on Scopus), gray sources (conferences, dissertation, and reports), and other sources (webpage of pertinent organizations, book, and experts). Experts' opinion, medical subject MeSH websites, synonym dictionaries, and keywords in pertinent articles were applied to find synonym keywords. To write syntax, AND/OR operators would be used. The syntax for each database listed above was written independently, as in the appendixes and Table 1.

### Study selection

After searching for synonyms, syntaxes were written according

to the type of database and using the tag structure for each database. The search process was done on each database separately. The Number of Needed Read index was calculated at each stage of the search. The allocation of tags in each database was continued until the desired index value is between 12 and 15. After reaching the desired index, the articles enter EndNote.

### Screening and data extraction

Inclusion criteria included all English-language articles published on the factors affecting the reduction of patient falls in the hospital and the consequences of intervention to prevent falls.

Exclusion criteria included articles that do not have the main text, studies that have not been on the approach to reducing patient falls, studies that are about reducing falls in certain groups outside the hospital, and non-English language articles.

Three independent researchers screened the articles and checked the titles and abstracts, based on the inclusion and exclusion criteria. Finally, the full texts of the articles were checked by the three researchers independently, and in case of disagreement, the problem would be settled by the fourth researcher. Data collection was done using a preplanned checklist, including information such as author's name, place of study, time of study, methodology, study population, and the key findings.

### Quality of assessment

Quality assessment was conducted after primary selection of the scientific text and removal of repetitious papers, based on the type of articles and using critical appraisal skills program (CASP), Newcastle–Ottawa Scale, and Strengthening the Reporting of Observational Studies in Epidemiology (STROBE). The Ottawa checklist includes eight items with scores from 0 to 10. So that, scores between 0 and 5 represent low quality, 6–7 represent moderate quality, and The value =8 represent good quality.<sup>[16]</sup> The CASP checklist consists of three sections and 10 questions, in total. The questions are answered by three alternatives (can't tell, no, yes) and papers that obtain more than 7 points enter the study. The STROBE checklist consists of 22 items and all covers all aspects of a study (objective, sampling, study plan, population, data collection, statistics, and results). The total score ranges from 0 to 44. In general, studies were classified into three categories of low quality (<15.5), moderate quality (15.5–29.5), and high quality (29.5–44). Studies of low quality were excluded.

### Ethics approval

The study was conducted after obtaining an approval from the Ethics Committee of Shahid Beheshti University of Medical Sciences.

### Strengths and limitations of study

Designing a good methodology for policymakers in the Ministry of Health of Iran are among the strengths of the study. One of the limitations of this study is the impossibility of reviewing articles published in non-English language.

**Table 1: Search for electronic databases according to the number of the related articles, number of needed read, syntax and search steps in Web of Science, PubMed, Scopus and ScienceDirect databases to identify effective factors in reducing falls among the hospitalized patients**

Databases	Research stage	Syntax	Numbers of articles	NNR	Comment
PubMed	1	((((((((((((((fall*[All Fields]) OR slip*[All Fields]) OR "fall Injury"[All Fields]) OR (injury[All Fields] AND fall[All Fields])) OR "Falling down"[All Fields]) OR "falling factor"[All Fields]) OR (factor* [All Fields] AND falling*[All Fields])) OR "falling index"[All Fields]) OR (index[All Fields]* AND falling[All Fields])) OR "accidental fall"[All Fields]) OR (accidental[All Fields]* AND fall[All Fields]))) AND (((((((hospital*[All Fields]) OR "Health care Service"[All Fields]) OR "Health service"[All Fields]) OR "Health Facility"[All Fields]) OR "Health center"[All Fields])) AND (((((((patient*[All Fields]) OR client[All Fields]) OR inpatient[All Fields]) OR sick[All Fields]) OR "Hospitalized patient"[All Fields]) OR "in-patient"[All Fields]) OR hospitalization[All Fields])) AND (((((((prevention*[All Fields]) OR decrease*[All Fields]) OR reduction[All Fields]) OR reduce[All Fields]) OR decline[All Fields]) OR restraint[All Fields]) OR abatement[All Fields])) AND ("1990/01/01"[Date - Publication]: "2019/09/30"[Date - Publication])	8534	25	4 related articles
	2	((((((((((((((fall*[Title/Abstract]) OR slip*) OR "fall Injury") OR (injury[Title/Abstract] AND fall[Title/Abstract])) OR "Falling down") OR "falling factor") OR (factor* AND falling*)) OR "falling index") OR (index* AND falling)) OR "accidental fall") OR (accidental* AND fall))) AND (((((((patient*[Title/Abstract]) OR client) OR inpatient[Title/Abstract]) OR sick) OR "Hospitalized patient") OR "in-patient") OR hospitalization) AND (((((((hospital*[Title/Abstract]) OR "Health care Service") OR "Health service") OR "Health Facility") OR "Health center")) AND (((((((prevention*[Title/Abstract]) OR decrease*) OR reduction) OR reduce) OR decline) OR restraint) OR abatement)) AND ("1990/01/01"[Date - Publication]: "2019/09/30"[Date - Publication])	4870	16.6	6 related articles
	3	((((((((((((((fall*[Title/Abstract]) OR slip*[Title/Abstract]) OR "fall Injury"[Title/Abstract]) OR (injury[Title/Abstract] AND fall[Title/Abstract])) OR "Falling down") OR "falling factor") OR (factor*[Title/Abstract] AND falling*[Title/Abstract])) OR "falling index") OR (index* AND falling)) OR "accidental fall") OR (accidental* AND fall))) AND (((((((hospital*[Title/Abstract]) OR "Health care Service"[Title/Abstract]) OR "Health service"[Title/Abstract]) OR "Health Facility"[Title/Abstract]) OR "Health center"[Title/Abstract])) AND (((((((patient*[Title/Abstract]) OR client[Title/Abstract]) OR inpatient[Title/Abstract]) OR sick[Title/Abstract]) OR "Hospitalized patient"[Title/Abstract]) OR "in-patient"[Title/Abstract]) OR hospitalization[Title/Abstract])) AND (((((((prevention*[Title/Abstract]) OR decrease[Title/Abstract]) OR reduce[Title/Abstract]) OR reduction[Title/Abstract]) OR decline[Title/Abstract]) OR restraint[Title/Abstract]) OR abatement[Title/Abstract])) AND ("1990/01/01"[Date - Publication]: "2019/09/30"[Date - Publication])	1489	12.5	8 related articles
Scopus	1	TITLE-ABS-KEY (fall*) OR TITLE-ABS-KEY (slip*) OR TITLE-ABS-KEY ("fall Injury") OR TITLE-ABS-KEY (injury AND fall) OR TITLE-ABS-KEY ("Falling down") OR TITLE-ABS-KEY ("falling factor") OR TITLE-ABS-KEY (factor* AND falling*) OR TITLE-ABS-KEY ("falling index") OR TITLE-ABS-KEY (index* AND falling) OR TITLE-ABS-KEY ("accidental fall") OR TITLE-ABS-KEY (accidental* AND fall) AND TITLE (hospital*) OR TITLE-ABS-KEY ("Health care Service") OR TITLE-ABS-KEY ("Health service") OR TITLE-ABS-KEY ("Health Facility") OR TITLE-ABS-KEY ("Health center") AND TITLE-ABS-KEY (patient*) OR TITLE-ABS-KEY (client) OR TITLE-ABS-KEY (inpatient) OR TITLE-ABS-KEY (sick) OR TITLE-ABS-KEY ("Hospitalized patient") OR TITLE-ABS-KEY ("in-patient") OR TITLE-ABS-KEY (hospitalization) AND TITLE-ABS-KEY (prevention*) OR TITLE-ABS-KEY (decrease*) OR TITLE-ABS-KEY (reduction) OR TITLE-ABS-KEY (reduce) OR TITLE-ABS-KEY (decline) OR TITLE-ABS-KEY (restraint) OR TITLE-ABS-KEY (abatement) AND (PUBYEAR<2019 AND PUBYEAR>1990)	3352	20	5 related articles
	2	TITLE (fall*) OR TITLE (slip*) OR TITLE ("fall Injury") OR TITLE (injury AND fall) OR TITLE ("Falling down") OR TITLE ("falling factor") OR TITLE (factor* AND falling*) OR TITLE ("falling index") OR TITLE (index* AND falling) OR TITLE ("accidental fall") OR TITLE (accidental* AND fall) OR TITLE (hospital*) OR TITLE ("Health care Service") OR TITLE ("Health service") OR TITLE ("Health Facility") OR TITLE ("Health center") AND TITLE (patient*) OR TITLE (client) OR TITLE (inpatient) OR TITLE (sick) OR TITLE ("Hospitalized patient") OR TITLE ("in-patient") OR TITLE (hospitalization) AND TITLE (prevention*) OR TITLE (decrease*) OR TITLE (reduction) OR TITLE (reduce) OR TITLE (decline) OR TITLE (restraint) OR TITLE (abatement) AND (PUBYEAR<2019 AND PUBYEAR>1990)		11.11	9 related articles

Contd...

**Table 1: Contd...**

Databases	Research stage	Syntax	Numbers of articles	NNR	Comment
Web of science	1	(TS=(fall*) OR TS=(slip*) OR TS=("fall Injury") OR TS=(injury AND fall) OR TS=("Falling down") OR TS=("falling factor") OR TS=(factor* AND falling*) OR TS=("falling index") OR TS=(index* AND falling) OR TS=("accidental fall") OR TS=(accidental* AND fall)) AND TS=(hospital*) OR TS=("Health care Service") OR TS=("Health service") OR TS=("Health Facility") OR TS=("Health center") OR TS=("Health care Service") OR TS=("Health service") OR TS=("Health Facility") OR TS=("Health center") AND TS=(patient*) OR TS=(client) OR TS=(inpatient) OR TS=(sick) OR TS=("Hospitalized patient") OR TS=("in-patient") OR TS=(hospitalization) AND TS=(prevention*) OR TS=(decrease*) OR TS=(reduction) OR TS=(reduce) OR TS=(decline) OR TS=(restraint) OR TS=(abatement)) AND PY=(2019-1990)	6054	20	4 related articles
	2	(TS=(fall*) OR TS=(slip*) OR TS=("fall Injury") OR TS=(injury AND fall) OR TS=("Falling down") OR TS=("falling factor") OR TI=(factor* AND falling*) OR TS=("falling index") OR TS=(index* AND falling) OR TS=("accidental fall") OR TS=(accidental* AND fall)) AND (TS=(hospital*) OR TI=("Health care Service") OR TI=("Health service") OR TI=("Health Facility") OR TI=("Health center") OR TI=("Health care Service") OR TI=("Health service") OR TI=("Health Facility") OR TI=("Health center")) AND (TI=(patient*) OR TS=(client) OR TI=(inpatient) OR TS=(sick) OR TS=("Hospitalized patient") OR TS=("in-patient") OR TS=(hospitalization) AND (TI=(prevention*) OR TS=(decrease*) OR TS=(reduction) OR TS=(reduce) OR TS=(decline) OR TS=(restraint) OR TS=(abatement)) AND PY=(2019-1990)	2476	12.5	8 related articles
ScienceDirect		Fall* OR slip* OR "fall Injury" OR "Falling down" OR "falling factor" OR "falling index" OR "accidental fall" AND hospital* OR "Health care Service AND patient* OR client OR inpatient OR sick" OR "Hospitalized patient" OR "in-patient" OR hospitalization Year: 1990-2019	614	11.11	9 related articles

NNR: Number of needed read

## CONCLUSION

The issue of falls has always been one of the concerns of officials in dealing with preventing and reducing hurts to patients in the hospital. According to the stated objective and the importance of the subject of never events, especially the fall of the patient, the researcher can identify solutions for preventing the fall of the patient at the hospitals. The information obtained from this study will be used to explain the clinical guidelines for preventing patient falls in Iranian hospitals. Ultimately, it will lead to scientific decisions and improve the readiness to prevent the patient from falling, in the areas of policymaking, planning, education and research at the hospital level, and promoting the health of the community.

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## Conflicts of interest

There are no conflicts of interest.

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