

Review

## Fall Prevention Knowledge and Attitude Tests-Surveys Used by Staff and Nurses: A Systematic Review of Current Literature

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**Academic Editor:** Hanna S. Schroeder

**Special Issue:** [Falls and Fractures in Older Adults: Causes and Prevention](#)

*OBM Geriatrics*

2025, volume 9, issue 2

doi:10.21926/obm.geriatr.2502317

**Received:** February 01, 2025

**Accepted:** June 18, 2025

**Published:** June 26, 2025

### Abstract

Falls are a serious global public health issue affecting individuals of all ages, resulting in serious injuries, fatalities, and extended hospital stays. While knowledge and attitude of healthcare staff toward fall prevention are understood to impact patient safety, less well known are the type and content of fall prevention surveys used to identify nurses' knowledge of fall prevention. Until now, no study has systematically reviewed the universe of existing tests, surveys, and programs used to assess fall prevention knowledge. This systematic review aims to describe existing tests and surveys used to assess the knowledge and attitudes of healthcare staff and nurses regarding fall prevention. Electronic databases PubMed, CINAHL, Scopus, Medline, ScienceDirect, and Psych Info were searched for English articles investigating existing surveys and tests of fall prevention knowledge among healthcare staff from 2005 to August 2024, focusing on studies in healthcare workers working in medical centers, working with adults >65 y.o. Of the 565 studies identified, twelve met the inclusion criteria: eight



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examined fall prevention knowledge, attitude, self-efficacy tests, and questionnaires among nurses and nursing students, and four examined fall prevention knowledge programs. One study examined the efficacy of a fall prevention program. Across all studies, various types of knowledge/self-efficacy questionnaires were utilized with overlapping content on fall definition, information on falls, teamwork, and reporting falls. Also, the educational studies suggested the importance of using fall prevention programs which include various components: online and in-person lectures, posters, and staff support, highlighting the need for continuous training rather than once for improved results. Overall, understanding the knowledge and attitudes of healthcare staff, especially nurses, toward fall prevention is crucial for improving patient safety and reducing adverse events in healthcare settings. Future research should include an assessment tool that considers all the components of behavioral change and captures all overlapping questions in one questionnaire, as well as including them in frequent training.

### **Keywords**

Fall prevention; knowledge and attitudes; scales; older adults; nursing education; health promotion behaviors and disease prevention

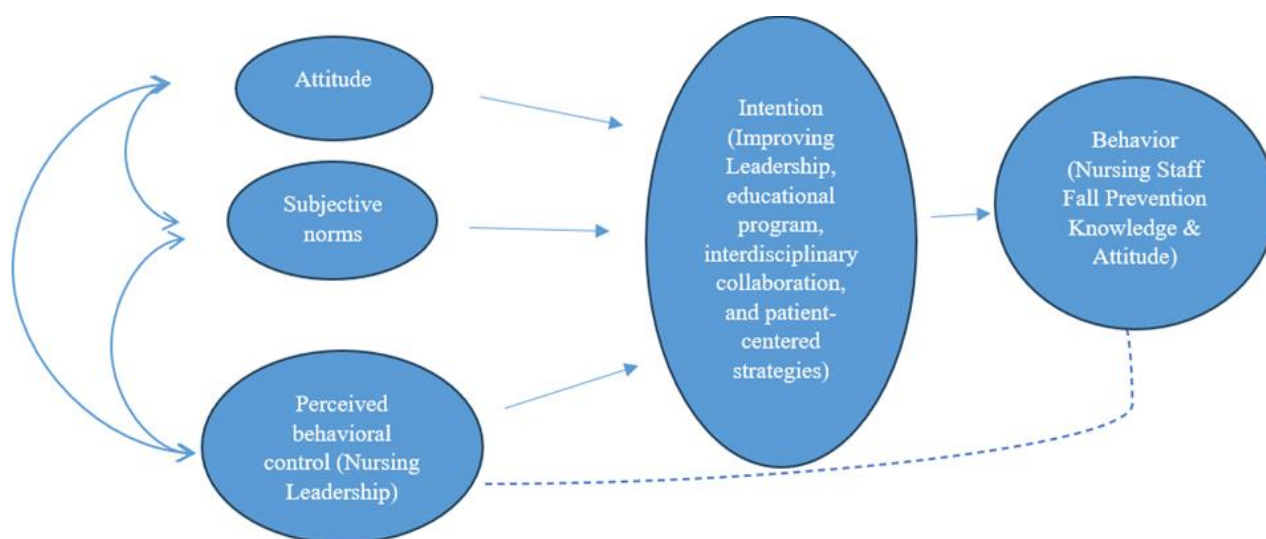
## **1. Introduction**

Falls in healthcare settings are persistent and costly issues, with direct implications for patient safety and quality of care [1]. Each year, thousands of patients' experience falls in hospitals, nursing homes, and rehabilitation facilities, leading to a wide range of adverse outcomes, from minor injuries to severe trauma such as fractures or head injuries [2]. In the United States, approximately one in three adults aged 65 and older living in the community experiences at least one fall each year [3]. Beyond physical harm, falls can also lead to psychological effects, such as fear of falling, reduced mobility, and diminished confidence, which collectively contribute to a decline in patient health and independence [4]. Falls that occur in healthcare settings are associated with extended hospital stays, higher readmission rates, and substantial increases in healthcare costs [2]. Given these significant impacts, fall prevention remains a primary focus in patient safety initiatives worldwide, especially as healthcare facilities work to meet standards set by accrediting bodies, such as The Joint Commission, which prioritizes fall prevention as a critical area of focus [2].

National professional societies recommend fall risk assessments as a key strategy for preventing falls [5], in addition to a comprehensive post-fall assessment for the secondary prevention of falls [6]. Healthcare providers, particularly nurses and frontline staff, are central to fall prevention efforts due to their direct, continuous interactions with patients [2]. These professionals are tasked with identifying patients at risk of falls, implementing individualized prevention strategies, and educating patients and their families on safety measures [7]. However, a provider's ability to effectively prevent falls is influenced by their knowledge, attitudes, and perceptions of fall prevention practices [2, 7]. Knowledge encompasses an understanding of risk factors, protocols, and interventions, while attitudes may include beliefs about the efficacy and importance of fall prevention measures, as well as perceptions of their role in fall prevention [8]. Together, knowledge and attitudes shape

healthcare providers' actions and engagement with fall prevention strategies, impacting overall patient outcomes, as well as recommendations for future actions and engagement to prevent falls [2, 8].

The *Theory of Planned Behavior (TPB)* provides a useful theoretical framework for understanding how healthcare providers' knowledge and attitudes toward fall prevention influence their actual behaviors [9-11]. According to the TPB, individuals' behaviors are determined by three key factors: 1) attitudes (beliefs about the benefits and outcomes of a behavior), 2) subjective norms (perceived social pressure to perform the behavior), and 3) perceived behavioral control (belief in one's ability to successfully perform the behavior) [10]. In the context of fall prevention, the TPB suggests that healthcare providers are more likely to implement effective fall prevention strategies if they have a positive attitude toward these strategies, perceive that others (such as colleagues or supervisors) support these behaviors, and believe they have the necessary skills and resources to carry them out [10]. This framework highlights how fall prevention knowledge and attitudes are not only about understanding risks but also about personal efficacy and social influences in the healthcare environment [9]. For this study, we adapted components of the TPB [11] to reflect key drivers relevant to nursing attitudes, subjective norms and perceived behavior control towards fall prevention. Figure 1 shows the modified version of the Theory of Planned Behavior framework, adapted from the parent TPB [11].



**Figure 1** Adapted conceptual model based on the Theory of Planned Behavior [11].

Understanding the various considerations healthcare staff face in determining how to prevent falls requires a closer investigation of their requisite knowledge and attitudes about fall prevention. Therefore, to ensure that healthcare staff and nurses possess the necessary knowledge and attitudes toward fall prevention, it is essential to employ accurate and reliable assessment tools. Surveys and tests are commonly used to measure these aspects, offering a way to identify knowledge gaps, assess readiness for training, and evaluate the effectiveness of educational interventions [8, 12]. However, the diversity of assessment tools poses challenges in standardizing evaluation and comparing results across studies. Existing instruments vary widely in terms of their content, psychometric validation, ease of use, and relevance to specific healthcare settings [1, 13]. Some surveys may emphasize clinical knowledge of fall risk factors, while others may focus more on

attitudes and self-efficacy in implementing prevention measures [13]. This variability highlights a need for systematic evaluation of these tools to ensure they are fit for purposes and that their findings can accurately inform fall prevention initiatives. As such, a systematic review was undertaken to present current knowledge and the state of the science metrics used for this purpose.

This systematic review aims to synthesize the current literature on tests and surveys used to assess fall prevention knowledge and attitudes among healthcare staff and nurses. Specifically, we examined the types of tools available, their underlying frameworks, and their psychometric properties (such as validity and reliability), as well as any significant findings these tools have produced regarding healthcare providers' understanding and attitudes toward fall prevention. By identifying gaps, inconsistencies, and strengths within the available tools, this review ought to guide future research and practice, ultimately supporting the development of standardized, evidence-based instruments for assessing fall prevention competencies in healthcare staff. Furthermore, insights gained from this review could inform tailored educational interventions, promote a safety-oriented culture, and enhance the effectiveness of fall prevention programs in healthcare settings.

## **2. Methods**

### ***2.1 Study Design and Search Strategy***

We followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. We searched across several electronic databases, including PubMed, CINAHL, Scopus, Medline, PsycINFO, and Science Direct from the year 2005 to August 2024. Keywords included "Fall prevention OR Falls OR Fall management", "Older adults OR Elderly OR Geriatrics", "Knowledge OR Attitude OR Practice OR Self-efficacy OR Health Knowledge OR Awareness OR Education", "Nurse OR Nursing OR Geriatric Nursing OR staff OR healthcare professionals", and "Test OR Scale OR Questionnaire OR survey OR Instrument OR Program". Boolean operators (AND, OR) were employed to refine the search results. The articles were uploaded to EndNote for categorization. Table 1 shows the search string for each database.

**Table 1** Search Strings.

| Data base      | Search terms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PubMed         | ((((("accidental falls"[Mesh]) OR (Accidental Falls[Title/Abstract]) OR ("Safety Management"[Mesh]) OR (Safety Management [Title/Abstract]) OR ("prevention and control" [Subheading]) OR (prevention and control [Title/Abstract]))) AND (("Aged"[Mesh]) OR ("Frail Elderly"[Mesh]) OR (Aged[Title/Abstract]) OR (Frail Elderly[Title/Abstract]))) AND (("Knowledge"[Mesh]) OR (Knowledge [Title/Abstract]) OR ("Knowledge Management"[Mesh]) OR ("Health Knowledge, Attitudes, Practice"[Mesh]) OR (Health Knowledge, Attitudes, Practice [Title/Abstract]) OR ("Attitude"[Mesh]) OR (Attitude [ Title/Abstract]) OR ("Professional Practice"[Mesh]) OR (Professional Practice [Title/Abstract]) OR ("Self Efficacy"[Mesh]) OR (Self efficacy [Title/Abstract]))) AND (("Nurses"[Mesh]) OR ("Geriatric Nursing"[Mesh]) OR ("Nursing Staff"[Mesh]) (Nurses [Title/Abstract]) OR (Geriatric Nursing[Title/Abstract]) OR (Nursing Staff[ Title/Abstract]))) AND (("Surveys and Questionnaires"[Mesh]) OR (Surveys and Questionnaires[Title/Abstract])) |
| CINHAL         | (fall prevention or fall control or fall reduction or fall risk) AND (elderly or aged or older or elder or geriatric) AND (knowledge or education or understanding or awareness) AND (nurse practitioner or advanced practice nurse or apn or np) AND (questionnaire or survey or scale or instrument)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Scopus         | (TITLE-ABS-KEY (elderly OR aged OR older OR elder OR geriatric) AND TITLE-ABS-KEY (knowledge OR education OR understanding OR awareness) AND TITLE-ABS-KEY (nurses OR lpn OR advanced-practice-nurse) AND TITLE-ABS-KEY (questionnaire OR survey OR scale OR instrument) AND TITLE-ABS-KEY (fall-prevention OR accidental-falls))                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Medline        | (Fall prevention in elderly OR accidental falls prevention) AND (elderly or aged or older or elder or geriatric) AND (knowledge or education or understanding or awareness) AND (nurse practitioner or advanced practice nurse or apn or np or health professionals or staff) AND (questionnaire or survey or scale or instrument)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| PsycINFO       | (Fall prevention in elderly OR accidental falls prevention) AND (elderly or aged or older or elder or geriatric) AND (knowledge or education or understanding or awareness) AND (nurse practitioner or advanced practice nurse or apn or np or health professionals, staff) AND (questionnaire or survey or scale or instrument)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Science Direct | (Fall prevention in elderly OR accidental falls prevention) AND (elderly or aged or older or elder or geriatric) AND (knowledge or education or understanding or awareness) AND (nurse practitioner or advanced practice nurse or health professionals, or staff) AND (questionnaire or survey or scale or instrument)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

## **2.2 Inclusion Criteria**

The inclusion criteria were studies 1) investigating existing surveys and tests on fall prevention knowledge 2) targeting nurses and medical staff in medical centers (Long term care facilities, rehabilitation facilities, Nursing homes), 3) having a population of patients 65 years and older, 4) quantitative, qualitative and mixed-method studies, and 5) with full text available in English.

## **2.3 Identification and Selection of Studies**

We screened articles' titles and abstracts for eligibility. Full-text articles of potentially relevant studies were retrieved and assessed against the inclusion criteria. Data was extracted using a standardized form, capturing the study's characteristics, instruments, psychometrics, and key findings. Two expert reviewers screened all studies independently and came to a consensus on discrepancies.

## **2.4 Quality Assessment**

We used the Critical Appraisal Skills Program checklists to assess the quality of studies [14]. These checklists evaluate study objectives, population definition, participation rate, exposure-outcome relationships, measurement validity, and control for confounders.

## **2.5 Data Synthesis and Analysis**

Data from all the eligible articles were extracted, and a table of evidence was made including study authors, publication year, country of origin, design, sample characteristics, study sites, knowledge tools used across the studies, and key findings (refer to Table 2). We reported the results in narrative form.

**Table 2** Evidence Table of included studies.

| Author (Year)<br>country                            | Population, Design                                                                                                                             | Instrument                                                                                                                                              | Purpose of instrument                                                                                                | Psychometrics<br>Reported                                                                       | Key findings                                                                                                                                                                              |
|-----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Dykes et al.<br>(2011)<br>USA [15]                  | Design: Mixed<br>method, scale<br>development<br>Population: Nurses<br>and assistants<br>RN n = 562<br>CNA n = 269<br>Setting: Hospitals       | Questionnaires<br>Self-efficacy for preventing<br>falls-Nurses (SEPF-N)<br>N = 11<br>Self-efficacy for preventing<br>falls-Assistants (SEPF-A)<br>N = 8 | Measure self-efficacy<br>in fall prevention                                                                          | Valid and<br>reliable<br>SEPFN Cronbach<br>$\alpha = 0.89$<br>SEPFA Cronbach<br>$\alpha = 0.74$ | Highly recommended for<br>measuring bedside staff's self-<br>efficacy beliefs in preventing<br>patient falls.                                                                             |
| Kim et al.<br>(2015)<br>South Korea<br>[16]         | Design: Descriptive<br>research<br>Population: Nursing<br>students<br>n = 404<br>Setting: Hospitals                                            | Questionnaire:<br>30 items: Awareness for fall<br>risk<br>13 items: attitude<br>15 items: knowledge of falls                                            | Exploring and<br>enhancing knowledge<br>on falls, attitude<br>towards falls, and<br>awareness of fall<br>prevention. | Cronbach<br>$\alpha = 0.75$                                                                     | Highly recommended to use<br>among students to assess their<br>knowledge on fall prevention.<br>Nursing students should be<br>encouraged to use fall risk tools.                          |
| Olij et al.<br>(2017)<br>The<br>Netherlands<br>[17] | design: Two round<br>Delphi study<br>Population: PTs,<br>nurses, occupational<br>therapists,<br>geriatricians<br>n = 125<br>Setting: Community | Questionnaires:<br>fall risk detection and fall<br>prevention programs                                                                                  | Directions for<br>improving falls<br>prevention activities                                                           | Validated by<br>expert panel                                                                    | Health professionals rarely<br>perform regular assessments to<br>detect fall risk.<br>Structured fall risk follow-up is<br>lacking.<br>Highly recommended for using in<br>large settings. |

|                                                |                                                                                                                             |                                                                                                                                                                                                                  |                                                                               |                                                                                                                    |                                                                                                                                                                                                                                                                                                                |
|------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Asiri et al.<br>(2018)<br>Saudi Arabia<br>[18] | Design: Observational<br>Population: Home health care professionals. nurses, PTs, physicians<br>n = 52<br>Setting: Hospital | Questionnaire:<br>8-item knowledge test (modified version of a test created by Alabama University) comprised current practice, information on fall risk factors, fall prevention strategies, fall risk knowledge | To determine and enhance the knowledge of falls risk and fall risk prevention | The original questionnaire was validated.                                                                          | Detecting fall risk: Taking fall risk history,<br>Nurses provided more fall risk interventions.<br>Nurses had the most knowledge of fall risk.<br>PTs may benefit from training programs to identify fall risk.                                                                                                |
| Han et al.<br>(2020)<br>South Korea<br>[19]    | Design: Descriptive research<br>Population: Nurses<br>n = 138<br>Setting: Long-term care hospital                           | Questionnaire<br>11 items: fall-related characteristics<br>14 items: knowledge about falls<br>13 items: attitude<br>13 items: preventive actions against falls                                                   | Identify the impact of knowledge and attitude on fall prevention.             | Cronbach $\alpha = 0.76$                                                                                           | Highly recommended to be used among students.<br>To increase fall prevention activities in long-term care hospitals, the nursing staff's attitude towards falls is important.                                                                                                                                  |
| Wang et al.<br>(2022)<br>China [20]            | Cross-sectional survey<br>Population: Nurses in China and USA<br>n = 1702<br>Setting: Hospitals                             | Questionnaire:<br>17-item survey on perception, knowledge, and attitude on fall risk.                                                                                                                            | To investigate the perceived knowledge of fall prevention.                    | Pre-post survey validity by 35 nurses.<br>Valid and reliable to be used internationally.<br>Reliability $p < 0.01$ | Nurses showed high knowledge of falls and fall risk prevention.<br>Six items had the lowest mean: vision assessment, foot problems assessment, balance problem assessment, vertigo and vestibular dysfunction, cognitive changes, and medication that cause falls.<br>More education is needed in these areas. |



|                                        |                                                                                                        |                                                                                                                                                                                                                                                                  |                                                                                                        |                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----------------------------------------|--------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Albasha et al. (2023) Ireland [21]     | Design: Cross-sectional survey<br>Population: Nurses n = 148<br>Setting: Long-term care facilities     | Questionnaire:<br>38 items- knowledge of fall risk, and knowledge, attitude and confidence in fall prevention.<br>Adapted from<br>1-Agency for Healthcare Research and Quality<br>2- Capability, opportunity and motivation to undertake health behavior change. | To explore suggested solutions for better falls prevention.                                            | The original questionnaires were validated. | Highly recommended to be used for exploring and enhancing the solutions for<br>Fall prevention:<br>1-Environment review for fall prevention.<br>2-Staff education<br>3-Individual observation and surveillance.<br>Specific to long-term care facility: Staff shortage, interprofessional collaboration.<br>Fall injuries prevention:<br>1-Environmental review<br>2-Using equipment, (e.g., crash mat)<br>3-Monitoring equipment more than staff supervision. |
| Alsaad et al. (2024) Saudi Arabia [22] | Design: Cross-sectional survey<br>Populations: Nurses<br>Setting: Hospitals Inpatient wards<br>n = 370 | Questionnaire<br>20 items- knowledge of fall risk<br>20 items- attitude towards fall prevention<br>14 items- practice related to falls.                                                                                                                          | To assess the knowledge of nursing staff on fall prevention and help to reduce the occurrence of falls | Low external validity                       | Highly recommended for detecting fall risk assessment and prevention.<br>The majority were aware of fall prevention policies and the need for interprofessional teams for fall risk prevention<br>Lowest knowledge on the association between previous and future falls.                                                                                                                                                                                       |

## Fall-prevention knowledge programs

|                                   |                                                                                                                             |                                                                                                                                                                                      |                                                                                                 |                                                                                                                   |                                                                                                                                                                                                                                                                                  |
|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Urban et al. (2020)<br>USA [23]   | Design: Prospective mixed method<br>Population: primary care staff: RN, APRN, physician)<br>n = 29<br>Setting: Primary care | STEADI toolkit and education<br>Using written and online materials.                                                                                                                  | To enhance staff's knowledge on fall assessment using the STEADI toolkit plus written material. | Not reliable in the long-term use of STEADI.                                                                      | Education materials did not increase the long-term use of the STEADI.<br>There was more intent to use STEADI in the education group.<br>Education may prevent fall behavior prevention over time.                                                                                |
| Bonner et al. (2007)<br>USA [24]  | Design: Single group repeated measure.<br>Population: nurses, CNA<br>n = 77<br>Setting: Hospital                            | Single education session on fall risk, 40 minutes, performed by students<br>Wearing a quick tip badge all the time.<br>10-item fall prevention pre-posttest 60 days after education. | Enhance fall prevention knowledge                                                               | Validity and reliability not established                                                                          | Fall risk knowledge improved, and falls reduced significantly post-education.                                                                                                                                                                                                    |
| Caton et al. (2011)<br>USA [25]   | Design: pre-posttest experimental<br>Population: Internal medicine residents<br>n = 51<br>Setting = Hospital                | (Aging Q <sup>3</sup> ) <sup>1</sup><br>Multicomponent education- 3-months<br>(Didactic lectures, posters, EMR cues, support from nurses, physicians, and staff)                     | To enhance medical residents' knowledge, skills, decisions, and interventions made about falls. | The education program has been validated to be used on a larger scale.<br>Pretest posttest differences $p < 0.01$ | The multicomponent education increased self-efficacy and knowledge of internal medicine residents on fall risk using EMR cues, support of nurses and staff and physicians, and didactic classes. Highly recommended to be used on a larger scale to improve fall risk knowledge. |
| Mcquown et al. (2020)<br>USA [26] | Design: Education development, Mixed-methods                                                                                | 10 Education sessions, Online and in person,                                                                                                                                         | To increase the number of health professions students                                           | Reflection and modification were made                                                                             | Highly recommended for students from all disciplines to learn about                                                                                                                                                                                                              |

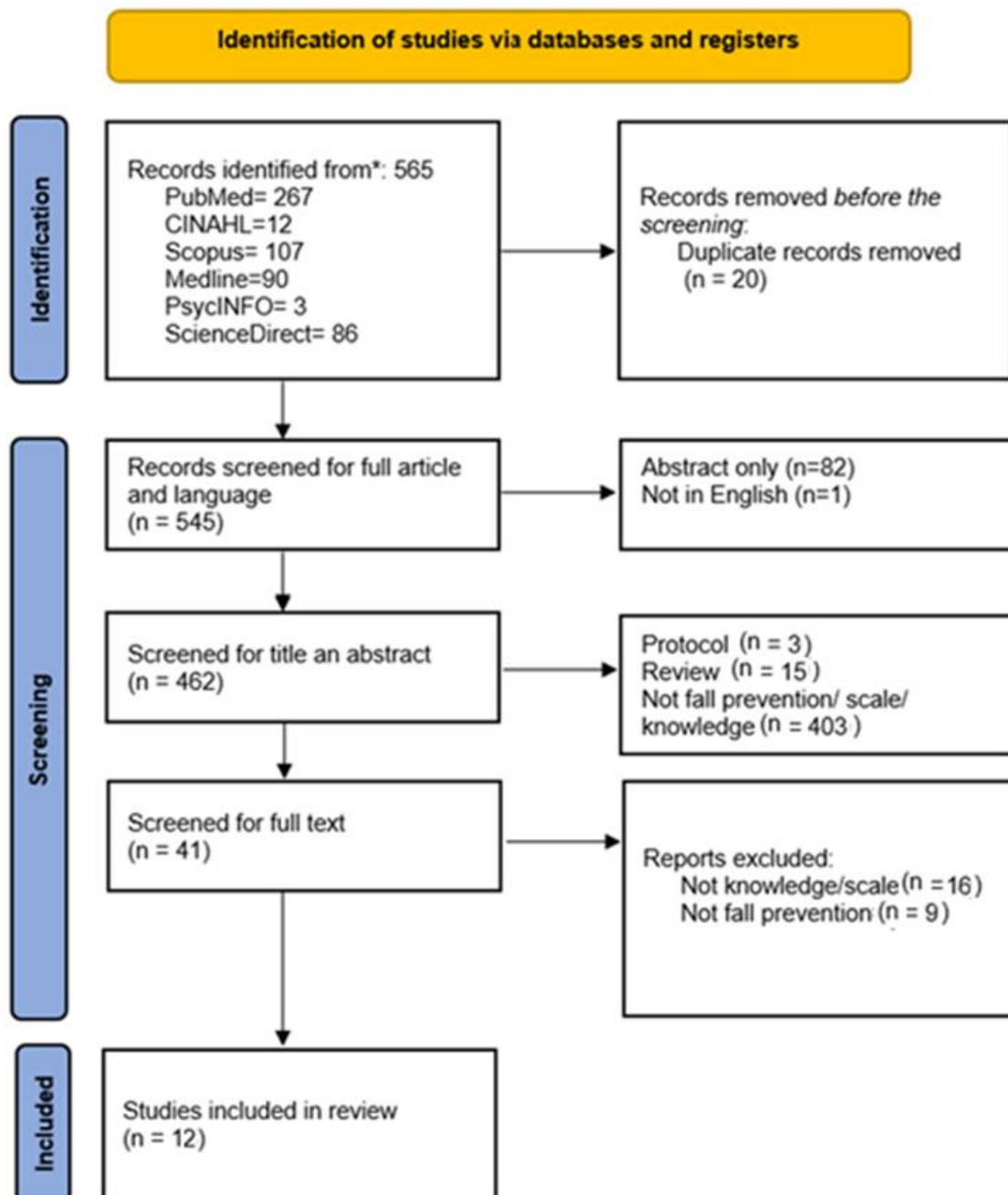
|                                                                                                                                                                          |                                                                                                                  |                                                                                  |                                                                                       |                                                      |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|------------------------------------------------------|
| Population: Students from different disciplines (nursing, NP, pharm, nutrition, social work, PT, medicine)<br>pilot n = 83<br>Large scale n = 368<br>Setting = Hospitals | Based on Plan-Do-Study-Act, Interprofessional plan based on interview, examination and screenings for fall risk. | prepared to work in Interprofessional practice environments to reduce fall risk. | based on challenges and barriers. 100% perceived reliability in small and large scale | interprofessional teamwork and addressing fall risk. |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|------------------------------------------------------|

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<sup>1</sup> Aging Q<sup>3</sup>: Quality Education, Quality Care, and Quality of Life; <sup>2</sup> STEADI: Stopping Elderly Accidents, Death, Injury.

### 3. Results

Titles and abstracts of 565 records and the full text of 41 articles were screened based on inclusion criteria by two independent reviewers. The most common reasons the articles were excluded were due to the authors not using fall prevention knowledge surveys. This review included 12 studies, eight investigating the tools and questionnaires, and four testing educational programs. Figure 2 illustrates the PRISMA flow diagram of our study selection.



**Figure 2** PRISMA flowchart of included studies.

### **3.1 Questionnaires and Surveys**

#### **3.1.1 Study Characteristics, Samples, and Setting**

The studies testing questionnaires and surveys included 3770 nurses and nursing students, with two out of eight studies including fewer than 100 participants. The studies validated and investigated the efficacy of questionnaires and surveys in fall prevention and fall detection knowledge on older adults among healthcare professionals.

#### **3.1.2 Fall Risk Prevention Self-Efficacy**

Two self-efficacy scales, the Self-Efficacy for Preventing Falls –Nurses (SEPF-N) and the Self-Efficacy for Preventing Falls–Assistants (SEPF-A) [15] examined self-efficacy for preventing falls among bedside staff. These scales evaluated specific practices such as fall risk communication, access to relevant information, risk assessment during shifts, teamwork, and collaboration with other healthcare providers. Both instruments demonstrated strong psychometric properties, SEPF-N Cronbach's  $\alpha = 0.89$  and the SEPF-A Cronbach's  $\alpha =$  of 0.74, indicating good internal consistency [15]. By capturing both individual behaviors and team-based strategies that influence fall prevention, these tools offer a reliable method to assess and potentially strengthen fall prevention efforts among nursing staff [15]. Although initially developed for nurses and nursing assistants, instruments are also recommended for broader use among other healthcare professionals involved in fall prevention initiatives [15].

#### **3.1.3 Fall Risk Knowledge, Attitudes, and Awareness**

Several studies demonstrated that knowledge, attitudes, and practices surrounding fall risk prevention among healthcare professionals are interconnected and critical for improving patient safety [16-21]. Recent studies suggested that although most nursing students and practicing nurses show moderate to high baseline knowledge of fall risk factors [16, 19, 20], significant gaps persist in key clinical areas, particularly in specialized assessments such as vision screening, balance evaluation, cognitive changes, and medication management [20, 22]. Cross-sectional and descriptive studies evaluated the efficacy of structured questionnaires consisting of important fall-related knowledge, training, and awareness before fall (such as Fall definition, history of falls, medication taking, chronic diseases, vision impairment, sensory deficit, cognitive changes) [16, 18-20] and after fall (such as Dealing with the patient, intervention, and reporting) [18, 20, 22].

In addition to knowledge and awareness, attitudes toward fall prevention emerged as a powerful predictor of preventive behavior. Positive attitudes were found to significantly influence nurses' likelihood of implementing fall prevention strategies [17, 19, 21]. This suggested that interventions aimed solely at increasing knowledge may be insufficient unless they also address healthcare providers' motivation and perceptions of fall prevention as a critical safety priority [18]. Using the framework COM-B (Capability, Opportunity, and Motivation to Undertake Health Behavior Change), questions such as how important fall risk assessment is, explored the behavior of nurses towards performing fall risk assessment [21]. Moreover, system-level and contextual factors also heavily influenced fall prevention efforts [21]. Studies that were conducted in long-term care settings validated questionnaires from the Agency for Healthcare Research and Quality (AHRQ) and the

COM-B behavior change model [18, 21]. They highlighted structural challenges such as staffing shortages, limited environmental safety reviews, and insufficient interdisciplinary collaboration, which hindered the consistent application of fall prevention strategies [18, 21]. Except for one questionnaire without high external validity [22], all other questionnaires showed high validity and reliability ( $p < 0.01$ ) and strong psychometric Cronbach's (Approximate  $\alpha = 0.75$ ).

#### 3.1.4 Fall Risk Detection

A two-round Delphi study by Olij et al. (2017) [17] among multidisciplinary professionals, including physical therapists, nurses, and geriatricians, developed consensus on fall risk detection practices. This questionnaire, which received high validity from experts, examined fall detection practices and the frequency of performing fall detection activities among older adults [17], including environmental conditions, cognitive function, and vision and hearing impairment [17]. Their findings identified major gaps in the regular assessment and structured follow-up of fall risk, providing valuable direction for system-level improvements [17]. The questionnaire was highly recommended for utilization in large settings.

### 3.2 Fall Prevention Programs

Four studies [23-26] evaluated the impact of educational programs and multicomponent interventions designed to improve fall prevention knowledge, attitudes, and practices among healthcare providers and students, with varying degrees of effectiveness and sustainability. The studies included 608 healthcare professionals (e.g., students and staff from different disciplines such as physical therapy, pharmacology, and medicine).

Short-term, single-session interventions conducted by Bonner et al. (2007) [24] and Urban et al. (2020) [23] demonstrated immediate improvements in fall risk knowledge and attitude towards fall prevention assessment. Bonner et al. (2007) [24] observed significant reductions in fall rates following a brief 40-minute education session supplemented by using "Quick Tip" badges. These badges helped staff receive tips and support at any time [24]. On the other hand, Urban et al. (2020) found that initial use of the STEADI framework and toolkit increased among primary care staff after an educational session using written and online materials [23], but its application declined over time, suggesting that one-time interventions may lack durability without continued reinforcement [23].

In contrast, more structured and sustained educational approaches showed greater promise in achieving long-term outcomes [25, 26]. McQuown et al. (2020) [26] developed a large-scale interprofessional education initiative incorporating Plan-Do-Study-Act cycles. The program was highly effective in preparing students across multiple health disciplines to work collaboratively on fall risk reduction, with both pilot and expanded cohorts reporting 100% perceived reliability [26]. This educational program consisted of an interview, examination, and screening for fall risk [26]. Similarly, Caton et al. (2011) [25] implemented a three-month multicomponent education program that significantly improved internal medicine residents' fall prevention knowledge and self-efficacy [25]. The Aging Q<sup>3</sup> (Quality education, Quality care, and Quality of life) educational sessions consisted of online and in-person lectures, posters, electronic medical records, and support from staff [25]. The program's high validity ( $p < 0.01$ ) revealed its effectiveness in a large-scale clinical training [25]. The educational interventions were effective in improving short-term fall risk knowledge and intent to act.

### **3.3 Quality Assessment**

The studies included in this review were mostly of high quality. All studies had a clearly defined study question/objective, population, exposures, measures, and findings. All studies had clear measures and defined outcomes. The weaknesses of the included studies were largely due to no external validity ( $n = 1$ ) and not enough subjects ( $n = 3$ ). Table 3 and Table 4 summarize the quality scores of the included studies.

**Table 3** Quality assessment of cross-sectional studies.

|                           | Clear aim | Appropriate method | Appropriate recruitment | Appropriate data collection | Enough participants | Result presentation | Rigorous data analysis | Clear findings | Applied to local population | Valuable research |
|---------------------------|-----------|--------------------|-------------------------|-----------------------------|---------------------|---------------------|------------------------|----------------|-----------------------------|-------------------|
| Kim et al., 2015 [16]     | Yes       | Yes                | Yes                     | Yes                         | Yes                 | Yes                 | Yes                    | Yes            | Yes                         | Yes               |
| Asiri et al., 2018 [18]   | Yes       | Yes                | Yes                     | Yes                         | No                  | Yes                 | Yes                    | Yes            | Can't tell                  | Yes               |
| Han et al., 2020 [19]     | Yes       | Yes                | Yes                     | Yes                         | Yes                 | Yes                 | Yes                    | Yes            | Yes                         | Yes               |
| Wang et al., 2022 [20]    | Yes       | Yes                | Yes                     | Yes                         | Yes                 | Yes                 | Yes                    | Yes            | Yes                         | Yes               |
| Albasha et al., 2023 [21] | Yes       | Yes                | Yes                     | Yes                         | Yes                 | Yes                 | Yes                    | Yes            | Yes                         | Yes               |
| Alsaad et al., 2024 [22]  | Yes       | Yes                | Yes                     | Yes                         | Yes                 | Yes                 | Yes                    | Yes            | Can't tell                  | Yes               |



**Table 4** Quality assessment of cohort studies.

|                           | Clear aim | Appropriate recruitment | Appropriate measures for exposure | Appropriate measure for the outcome | Important confounding factors | Enough follow-up subjects | Clear findings | Precise results | Accurate results | Applied to the local population | Fitting available evidence | Clear implications |
|---------------------------|-----------|-------------------------|-----------------------------------|-------------------------------------|-------------------------------|---------------------------|----------------|-----------------|------------------|---------------------------------|----------------------------|--------------------|
| Dykes et al., 2011 [15]   | Yes       | Yes                     | Yes                               | Yes                                 | Yes                           | Yes                       | Yes            | Yes             | Yes              | Yes                             | Yes                        | Yes                |
| Olij et al., 2017 [17]    | Yes       | Yes                     | Yes                               | Yes                                 | Yes                           | Yes                       | Yes            | Yes             | Yes              | Yes                             | Yes                        | Yes                |
| Urban et al., 2020 [23]   | Yes       | Yes                     | Yes                               | Yes                                 | Yes                           | No                        | Yes            | Yes             | Yes              | Can't tell                      | Yes                        | Yes                |
| Bonner et al., 2007 [24]  | Yes       | Yes                     | Yes                               | Yes                                 | Yes                           | Yes                       | Yes            | Yes             | Yes              | Yes                             | Yes                        | Yes                |
| Caton et al., 2011 [25]   | Yes       | Yes                     | Yes                               | Yes                                 | Yes                           | Yes                       | Yes            | Yes             | Yes              | Can't tell                      | Yes                        | Yes                |
| Mcquown et al., 2020 [26] | Yes       | Yes                     | Yes                               | Yes                                 | Yes                           | Yes                       | Yes            | Yes             | Yes              | Yes                             | Yes                        | Yes                |

## **4. Discussion**

To our understanding, this is the first review synthesizing findings from studies evaluating questionnaires, surveys, and educational interventions aimed at improving fall prevention knowledge, self-efficacy, and practices among healthcare providers and students. Validated questionnaires demonstrated strong psychometric properties and effectively assessed knowledge, attitudes, and practices related to fall prevention using questionnaires with overlapping questions. On the other hand, educational programs—particularly multi-component and interdisciplinary initiatives—showed greater success in achieving sustained improvements in fall prevention behaviors, especially by using online and in-person lectures with other types of materials. However, notable gaps remained in specialized clinical skills, long-term behavior change, and system-level support, highlighting critical areas for future intervention.

### **4.1 Effectiveness of Questionnaires and Surveys**

Fall prevention knowledge, attitude, detection, and self-efficacy are essential for healthcare providers for early identification of risk factors, implementing interventions, and reducing the incidence of fall-related injuries among older adults [4, 8, 19]. The validated questionnaires and surveys have proven effective in fall-related knowledge assessment among nurses and healthcare professionals. Most of the questionnaires and surveys demonstrated strong psychometric properties, with Cronbach's alpha values generally above 0.75, indicating good internal consistency. Among these validated tools, several stood out for their comprehensive assessment of key factors influencing fall prevention. For example, surveys such as the Self-Efficacy for Preventing Falls–Nurses (SEPF-N) and Self-Efficacy for Preventing Falls–Assistants (SEPF-A) [15] effectively captured both individual behaviors and team-based strategies crucial to fall prevention practices. Across other tools, common items assessed understanding of fall risk factors (e.g., medication use, prior falls, depression), concern for patient safety, and behaviors such as incident reporting and participation in fall prevention policies. Despite being developed independently, these surveys often addressed similar themes—such as perceptions of fall inevitability, the impact of fear, and the importance of team involvement, suggesting strong conceptual alignment across instruments in measuring the cognitive, emotional, and behavioral components of fall prevention practice. This alignment provides a useful foundation for comparing results across studies and identifying consistent knowledge gaps in fall prevention. Although most nursing students and practicing nurses showed moderate to high baseline knowledge of fall risk factors [16, 19, 20], significant gaps persisted in critical clinical areas. Specialized assessments—such as vision screening, balance evaluation, cognitive assessment, and medication review—were consistently identified as areas of weakness [20, 22]. These deficiencies highlight the urgent need for curriculum enhancement and ongoing professional development that targets specific risk factors rather than merely providing general awareness. Including questions as well as training targeting the abovementioned areas may help ensure that healthcare providers are equipped to recognize and address the most clinically relevant fall risk factors in practice. Attitudes toward fall prevention emerged as strong predictors of preventive behavior [19, 27, 28]. Studies indicated that healthcare providers with more positive attitudes were more likely to implement fall prevention strategies effectively [19, 21]. The findings suggest that increasing knowledge alone is insufficient; interventions and training must also address motivational factors and perceptions about the importance of fall prevention to foster sustained

behavioral change [18]. Importantly, findings from the questionnaires revealed that nurses often demonstrated greater fall risk knowledge compared to other disciplines, such as physical therapists and physicians [18]. However, interdisciplinary gaps in fall prevention competencies remain a significant concern. Several studies emphasized the need for robust interprofessional education models to ensure that all healthcare providers—regardless of discipline—possess consistent knowledge and skills in fall risk assessment and management [18, 21]. Furthermore, structural challenges, particularly in long-term care settings, such as inadequate environmental reviews, staffing shortages, and insufficient interprofessional collaboration, were cited as major barriers to effective fall prevention practices [21, 29]. To better reflect these real-world challenges, future fall prevention knowledge tests should incorporate new items that assess understanding of environmental safety checks, team-based coordination, and system-level barriers, ensuring a more comprehensive evaluation of preparedness in complex care settings.

#### **4.2 Impact of Fall Prevention Educational Programs**

Educational interventions demonstrated varying effectiveness based on their structure and duration. Short-term, single-session programs [23, 24] were effective in producing immediate gains in fall risk knowledge and attitudes, and the long-term sustainability of these changes was limited; as Urban et al. (2020) [23] highlighted, without ongoing system-level support, the improvements in practice diminished over time. This underscores the critical need for sustainable education models and continuous reinforcement strategies to maintain behavior change. In contrast, multicomponent and interdisciplinary educational approaches [25, 26] yielded more durable and meaningful outcomes. Long-term programs incorporating elements such as Plan-Do-Study-Act cycles [26], interdisciplinary training, use of electronic medical record cues, and active learning strategies consistently demonstrate more sustainable improvements in fall prevention knowledge, self-efficacy, and collaborative practice behaviors among healthcare providers [26]. These initiatives demonstrated high reliability and validity, and significantly improved participants' fall prevention knowledge, self-efficacy, and collaborative practice behaviors. Such iterative, large-scale educational models were highly recommended for widespread implementation. Collectively, the findings suggest that while short educational efforts can improve immediate knowledge and awareness, multicomponent, interdisciplinary, and iterative training models are necessary to achieve sustainable behavioral change and strengthen fall prevention practices across healthcare settings. These models not only improved attitudes and self-efficacy (enhancing perceived behavioral control) but also strengthened subjective norms by promoting collaborative practice and embedding fall prevention behaviors into team-based care structures and systems [30]. Our results are aligned with the TPB framework [10], which posits that behavior change is driven by intention, and that intention is influenced by three core components: attitudes toward the behavior, subjective norms, and perceived behavioral control. Overall, all the fall prevention questionnaires and educational programs were highly recommended for improving fall risk assessment knowledge among nurses and healthcare professionals working with older adults. Leveraging validated questionnaires to capture discipline-specific knowledge gaps will also enable the development of more targeted, interdisciplinary fall prevention programs that address the needs of a broader range of healthcare professionals.

### **4.3 Implications for Practice**

This review highlights several important implications for healthcare practice. First, using existing validated questionnaires, health care professionals may develop more comprehensive questionnaires and training as part of pre-employment documents for future staff to reduce and prevent falls among older adults. Second, the comparison between educational programs showed that healthcare providers and medical centers should move beyond a single session training targeting a specific type of profession and design ongoing, structured programs that foster interdisciplinary collaboration, engage leadership, and address organizational barriers. Third, professional development efforts must prioritize not only enhancing knowledge but also shifting attitudes and fostering a culture that values and prioritizes fall prevention. System-level improvements, including routine environmental reviews, robust staff education initiatives, and greater emphasis on interdisciplinary teamwork, are necessary to create a healthcare environment conducive to effective and sustainable fall prevention. Future initiatives should be designed to integrate individual, team, and organizational strategies to maximize patient safety and reduce fall-related injuries across settings.

### **4.4 Limitations**

Although this review comprehensively studied the existing surveys, tests, and programs regarding fall prevention knowledge among nurses and healthcare professionals, it has some limitations. First, the search strategy was limited to full reports published in English, which may introduce publication and selection bias, especially since different countries may have developed questionnaires in foreign languages. Second, most of the studies focused on nurses and nursing students, with relatively fewer assessments involving other healthcare disciplines such as physicians, physical therapists, or occupational therapists. This disciplinary imbalance may limit the applicability of findings to fully interdisciplinary fall prevention efforts. Additionally, although the included studies were of high quality, the risk of bias is still possible.

### **4.5 Conclusion**

This systematic review highlights the potential for significant improvements in fall prevention through surveys and education, collaboration, patient-centered care, and supportive policies. However, addressing limitations such as population variability, resource constraints, and sustained engagement will require further research and policy attention. Developing adaptable, cost-effective, and evidence-based fall prevention strategies is essential for advancing patient safety and mitigating fall risks across diverse healthcare settings. Understanding the knowledge and attitudes of healthcare staff, especially nurses, toward fall prevention education, and utilizing the TPB is recommended for developing more patient-centered and interdisciplinary fall prevention knowledge tests and training. Identifying the limitations and gaps in the existing tests and surveys can guide future research in the development of more effective tools for assessing healthcare staff knowledge and attitudes related to fall prevention. Ideally, future research should include an assessment tool that considers all the components of behavioral change that resonate with the TPB.

## Acknowledgments

We extend our sincere gratitude to all individuals who contributed to the completion of this systematic review.

## Author Contributions

Dr. Taherzadeh was involved in conducting evidentiary literature search, data analysis and writing up of the manuscript; Dr. Gray-Miceli was involved in the creation of the research question, provided expert review of data, and writing up of the manuscript; Dr. Zukowsky, and Dr. Gray provided secondary review of the data; Dr. Ratcliffe reviewed data analysis plan.

## Competing Interests

The authors report no conflict of interest.

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