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Gap between risk factors and prevention strategies? A nationwide survey of fall prevention among medical and surgical patients

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Abstract

Aims: This study aimed to determine the extent to which nurses report assessing evidence-based falls risk factors and implementing targeted prevention for medical and surgical patients in China.

Design: This study was a national online survey.

Methods: The respondents were registered nurses working in medical and surgical units in 662 Chinese hospitals. The data concerning the falls risk factor assessments

and targeted interventions implemented by nurses were collected online by the Nursing Management Committee of the Chinese Nursing Association in China in 2019.

Results: In total, 68 527 valid questionnaires were returned (95.0%). In medical and surgical units, nurses were most likely to report assessing balance, mobility and strength (81.6%) and orthostatic hypotension (76.4%) in falls patients and least likely to report assessing continence (61.3%) and feet and footwear (55.8%). Ensuring the use of appropriate footwear (79.3%) and managing syncope, dizziness and vertigo (73.8%) were the most common multiple interventions, while managing postural hypotension (48.8%) and cognitive impairment (48.4%) was the least common. Nine falls risk factors with clearly matched multifactorial interventions were identified in medical and surgical units (68.2%–97.1%).

Conclusions: The implementation of multifactorial interventions in medical and surgical wards is inconsistent as reported by nurses in medical and surgical wards. Throughout China, nurses are generally concerned about falls risk factors and prevention for their patients; however, limited attention has been focused on continence, feet and footwear assessment and the management of cognitive impairment. Evidence-based falls prevention should be further tailored to the specific risk factors of each patient.

Impact: Best practice guidelines for falls prevention in hospitals have been developed and published, and it is important for nurses to use these guidelines to guide practice. Our findings identify that in routine care, healthcare providers and hospitals can prevent falls.

KEYWORDS
assessment, falls prevention, hospital, medical and surgical units, nurse, risk factors

1 | INTRODUCTION

Falls are common among hospitalized patients and have serious consequences for both patients and healthcare systems (Centers for Disease Control & Prevention, 2017; Healey et al., 2008; Hill et al., 2019; Joint Commission, 2015; National Health Service Improvement, 2017). It is estimated that falls occur at a rate of 3.3 to 11.5 falls per 1000 bed-days (Bouldin et al., 2013). The Agency for Healthcare Research and Quality (AHRQ) reported that 700,000 to 1 million patients fall each year (Currie, 2008). In China, the median incidence of falls per 1000 patient days in 490 tertiary hospitals was 0.05, with a median falls injury rate of 73% (Wu et al., 2019). In the United Kingdom, the rate of reported falls was found to be 6.6 falls per 1000 bed-days in hospital settings as reported by the Royal College of Physicians (RCP), resulting in a cost over £634 million in 2015 (Centers for Disease Control & Prevention, 2017). Patients in medical and surgical units are at a particularly high risk of falls due to complex and variable disease and risk factors, with approximately 3.67 to 6.26 falls per 1000 bed-days (Williams et al., 2014). Falls in hospitals lead to physical and psychological harm, reduced health-related quality of life and increased hospital stays and healthcare costs. Compared with

nonfallers, acute patients who fall in a hospital have a mean additional hospital cost of $6669 (Morello et al., 2015). Up to 20% of patient falls in medical and surgical units result in some injury, with 2% resulting in serious consequences (e.g. hip fracture, head injury or even death) (Williams et al., 2014). Developing and implementing best practices for falls prevention are crucial for reducing falls and minimizing fall-related injuries.

Therefore, in this national online study, we investigated whether falls risk factor assessment and targeted evidence-based prevention interventions have been implemented among patients in medical and surgical units in Chinese hospitals. This work is based on the perceptions of nurses rather than actual effectiveness.

2 | BACKGROUND

Preventing falls is a national patient safety goal (Chinese Hospital Association, 2017), with falls considered 'never events', representing 'high-cost, high-volume events that could be reasonably prevented by the application of evidence-based guidelines' in hospitals (Waters et al., 2015). The Sentinel Event Alert reported that falls prevention is difficult and complex (Joint Commission, 2015).

Each patient has an individualized set of falls risk factors, and thus, falls prevention interventions should be targeted and individualized (Government of South Australia: SA Health, 2016). There is no universal falls prevention method that is appropriate for all patients (Ganz et al., 2013).

Best practice guidelines for hospitals have been developed and published, providing recommendations for strategies that nurses can use to prevent falls, including establishing a multidisciplinary team, conducting falls risk screening and assessment, implementing standard falls prevention and targeted falls prevention based on screening and assessment, minimizing injuries from falls and performing post management (Canadian Patient Safety Institute, 2015; Kruschke & Butcher, 2017; Government of Western Australia: Department of Health, 2018; Kim et al., 2017; National Institute for Health and Care Excellence, 2013; Registered Nurses Association of Ontario, 2017). These recommendations have been successfully implemented and have been shown to be effective in preventing falls in hospitals (Cuttler et al., 2017; Hempel et al., 2013; Morello et al., 2017; Stephenson et al., 2016).

Medical and surgical units are the basis of a hospital, but these units do not always receive enough attention. The incidence of patient falls and related injuries varies according to unit-specific characteristics, and medical and surgical patients are at an increased risk of falling (Williams et al., 2014). Patient-centred targeted prevention refers to certain multiple or multifactorial interventions targeting identified risk factors. Thus, it is important to customize targeted and individualized falls prevention in medical and surgical units due to patient-specific circumstances. To the best of our knowledge, limited studies investigated the adherence of nurses to evidence-based practice guidelines for falls risk factor assessments and matched prevention in medical and surgical units. Collecting such information could help identify and understand the gaps in routine care and areas in which healthcare providers and hospitals can improve to prevent falls. Given these considerations, we identified the practices of falls risk factor assessment for medical and surgical patients with evidence-based recommendations. We also evaluated the targeted falls prevention and unit-specific interventions that were implemented in medical and surgical units.

3 | THE STUDY

3.1 | Aims

The purpose of this study was to determine the extent to which nurses report assessing evidence-based falls risk factors and implementing targeted prevention for medical and surgical patients in China.

3.2 | Design

A national online survey was performed.

3.3 | Participants

A steering committee of nursing managers from various Chinese provinces and cities formed in July 2019 invited all registered nurses representing the medical and surgical units in their hospitals to participate through email, telephone or local meetings. The 31 provinces and cities included in this study were Anhui, Beijing, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Henan, Heilongjiang, Hubei, Hunan, Jilin, Jiangsu, Jiangxi, Liaoning, Inner Mongol, Ningxia, Qinghai, Shandong, Shanxi, Shanxi, Shanghai, Sichuan, Tianjin, Tibet, Xinjiang, Yunn, Zhejiang and Chongqing. The participants were registered nurses ($n = 72,164$) working in medical and surgical units in primary, secondary and tertiary hospitals in the provinces and cities included in the study. No formal sample size estimation was conducted for this study.

We conducted an online-based survey between 1 and 14 August 2019 to gather the data. A pilot investigation involving 15 registered nurses, senior nurses, supervisor nurses and nursing managers was performed to improve the questionnaire. QR codes linked to the survey were sent to chief or associate chief nurses to invite medical and surgical nurses to participate through the Nursing Management Committee of the Chinese Nursing Association. All participants were informed that the survey was anonymous and voluntary and that they had the right to refuse to participate at any stage.

3.4 | Data collection

The survey questionnaire included 22 questions and 80 items and took the respondents approximately 10 min to complete. Data concerning the assessment of common falls risk factors and falls prevention interventions performed in medical and surgical units were collected. Then, we categorized the targeted interventions by the risk factors assessed and the reported implementation in routine care. The data were entered into two tables (spreadsheets), cleaned and checked by two researchers.

3.5 | Ethical considerations

The Jiangsu Province Hospital's human research ethics committee approved this study (approval number 2019-SR-435).

3.6 | Research variables and instrument

For the instrument development, a literature search using PubMed, CINAHL, Embase, Cochrane Library, Web of Science databases and related websites was conducted to retrieve guidelines, best practice, evidence summary, expert consensus and systematic reviews published between 2000 and 2018. The medical subject heading (MeSH) terms and English words included accidental falls, falls, falling, risk assessment, risk factors and prevention for preventing falls in hospitals.

Eventually, in total, 22 articles were selected. Based on a systematic literature review and group discussion, the survey questionnaire used in this study was designed, and then, seven experts (including two nursing management experts, two clinical nursing experts and three clinical nurses) were invited to conduct two rounds of expert consultation and revision. The item-level content validity index (I-CVI), scale-level content validity index and averaging calculation method (S-CVI/Ave) were implemented to assess the content validity (Polit & Beck, 2006). In total, our questionnaire included five domains and 80 items; the I-CVI ranged from 0.87 to 0.98, and the S-CVI/Ave was 0.97. The questionnaire included sections concerning falls risk factor assessment and multiple and multifactorial interventions for falls prevention.

3.6.1 | Falls risk factor assessment

Our instrument was adapted from the Registered Nurses' Association of Ontario (RNAO) Clinical Best Practice Guidelines for Preventing Falls and Reducing Injuries from Falls 2017 (Registered Nurses Association of Ontario, 2017) and the Winnipeg Regional Clinical Practice Guidelines for Falls Prevention and Management (Winnipeg Regional Health Authority, 2011). These clinical guidelines recommend a falls risk assessment for those who exceed the threshold of the falls risk screening, those who are considered at a high risk of falls in the hospital, those who have experienced a fall, those who are in a patient environment that has changed and those who have exhibit changes in functional status (Winnipeg Regional Health Authority, 2011; Registered Nurses Association of Ontario, 2017). To develop individualized falls prevention interventions, the following nine falls risk factors need to be comprehensively assessed: balance, mobility and strength; cognitive impairment; incontinence; orthostatic hypotension; syncope, dizziness and vertigo; medication; impaired vision; environment and feet and footwear.

3.6.2 | Multiple and multifactorial interventions for falls prevention

Targeted interventions can be multiple interventions 'where everyone receives the same, fixed combination of interventions' or multifactorial interventions 'where people receive multiple interventions, but the combination of these interventions is tailored to the individual, based on an individual assessment' (Australian Commission on Safety and Quality in Healthcare, 2009). There are 22 targeted falls interventions (Australian Commission on Safety and Quality in Healthcare, 2009; Canadian Patient Safety Institute, 2015; Government of South Australia: SA Health, 2016; Ganz et al., 2013; Lamb et al., 2011; Registered Nurses Association of Ontario, 2017) that are grouped into the following nine categories: (1) environmental modifications, including the maintenance of a clean and dry floor surface, locking of bed brakes and installation of rails in bathrooms and corridors; (2) medication management, including medication review and education concerning medication use; (3) management of balance, mobility and strength, including the use of walking aids, exercise and physical

training and observation and supervision; (4) management of cognitive impairment, including delirium management, cognitive therapy, observation and supervision; (5) continence management, including toileting assistance and the use of an indwelling catheter; (6) management of postural hypotension, including monitoring postural blood pressure, medication review and elevation of the head of the bed; (7) management of syncope, dizziness and vertigo, including the assessment and management of dizziness and vertigo and minimization of asthma triggers; (8) vision interventions, including observation and supervision, assessments and referrals and the provision of adequate lighting and (9) the use of appropriate footwear, including the use of safe footwear.

3.7 | Data analysis

We conducted the statistical analyses using IBM SPSS Statistics 18 (IBM). The data are summarized as frequencies and percentages. Chi-square tests were used to analyse the categorical data to compare the falls risk factor assessment and multiple and multifactorial interventions for falls prevention between medical and surgical units, and a p-value <0.01 was regarded as statistically significant (Ni, 2003).

4 | RESULTS

4.1 | Sample characteristics

The demographics of the participants in this survey are presented in Table 1. In total, 68,527 nurses from 662 hospitals completed this online survey, with a response rate of 95.0% (68,527/72,164). The participants were predominantly senior nurses (n = 31,595, 46.1%), and 69.5% (n = 47,638) held a bachelor's degree. Fifteen thousand one hundred and sixteen (21.9%) nurses had less than 3 years of experience working in medical and surgical wards, and nearly half (n = 33,425, 48.8%) had 4 to 10 years of experience. Most nurses (n = 53,179, 77.6%) worked in tertiary hospitals, followed by secondary hospitals (n = 15,150, 22.1%) and primary hospitals (n = 198, 0.3%); the majority worked in medical wards (n = 40,629, 59.3%) and the remainder worked in surgical wards (n = 27,898, 40.7%).

4.2 | Falls risk factor assessment

As shown in Table 2, assessing falls risk factors was more common in medical units than in surgical units, including balance, mobility and strength (p < 0.001); cognitive impairment (p < 0.001); continence (p < 0.001); orthostatic hypotension (p < 0.001); syncope, dizziness and vertigo (p < 0.001); medication (p < 0.001); impaired vision (p < 0.001) and environment (p < 0.001). In medical and surgical units, the most commonly evaluated factors were balance, mobility and strength (81.6%); orthostatic hypotension (76.4%); syncope, dizziness and vertigo (76.1%) and cognitive impairment (74.5%). The least

Characteristic	All n (%)	Medical wards n (%)	Surgical wards n (%)	p-value
Educational attainment				
Below a university degree	20,403 (29.8)	12,413 (30.6)	7990 (28.6)	<0.001
Bachelor's degree	47,638 (69.5)	27,929 (68.7)	19,709 (70.6)	
Graduate or PhD degree	486 (0.7)	287 (0.7)	199 (0.7)	
Professional title				
Registered nurse	18,077 (26.4)	11,016 (27.1)	7061 (25.3)	<0.001
Senior nurse	31,595 (46.1)	18,701 (46.0)	12,894 (46.2)	
Supervisor nurse	16,291 (23.8)	9478 (23.3)	6813 (24.4)	
Associate chief nurse	2400 (3.5)	1349 (3.3)	1051 (3.8)	
Chief nurse	164 (0.2)	85 (0.2)	79 (0.3)	
Duration of working (years)				
0–3	15,016 (21.9)	8983 (22.1)	6033 (21.6)	<0.001
4–10	33,425 (48.8)	19,982 (49.2)	13,443 (48.2)	
11–20	14,665 (21.4)	8579 (21.1)	6086 (21.8)	
>20	5421 (7.9)	3085 (7.6)	2336 (8.4)	
Hospital level				
Tertiary hospital	53,179 (77.6)	31,054 (76.4)	22,125 (79.3)	<0.001
Secondary hospital	15,150 (22.1)	9443 (23.2)	5707 (20.5)	
Primary hospital	198 (0.3)	132 (0.3)	66 (0.2)	

Note: Chi-square test.

Common risk factors	All n (%)	Medical wards n (%)	Surgical wards n (%)	p-value
Balance, mobility and strength	55,917 (81.6)	33,681 (82.9)	22,236 (79.7)	<0.001
Cognitive impairment	51,044 (74.5)	30,543 (75.2)	20,501 (73.5)	<0.001
Continence	42,384 (61.9)	25,957 (63.9)	16,427 (58.9)	<0.001
Orthostatic hypotension	52,356 (76.4)	31,302 (77.0)	21,054 (75.5)	<0.001
Syncope, dizziness and vertigo	52,165 (76.1)	31,865 (78.4)	20,300 (72.8)	<0.001
Medication	47,836 (69.8)	28,796 (70.9)	19,040 (68.2)	<0.001
Impaired vision	46,036 (67.2)	27,892 (68.7)	18,144 (65.0)	<0.001
Environment	44,097 (64.3)	26,414 (65.0)	17,683 (63.4)	<0.001
Feet and footwear	38,426 (56.1)	22,809 (56.1)	15,617 (56.0)	0.677

Note: Chi-square test.

commonly evaluated factor was feet and footwear (56.1%). In general, continence, medication, impaired vision and environment were not assessed in more than 20% of medical and surgical patients.

4.3 | Multiple interventions for falls prevention

Figure 1 shows the distribution of multiple falls interventions in medical and surgical units. The use of appropriate footwear (79.3%) and management of syncope, dizziness and vertigo (73.8%) were the most frequent falls prevention interventions, while management of postural hypotension (48.8%) and management of cognitive impairment

(48.4%) were the least frequent. Regarding the falls prevention interventions used in the two types of units, the management of syncope, dizziness and vertigo ($p < 0.001$) was significantly more common in medical units, while the other interventions (e.g. use of restraints) ($p < 0.001$) were more common in surgical units (see Table 3).

4.4 | Multifactorial interventions for falls prevention

Table 4 shows the details of the multifactorial interventions implemented based on falls risk factor assessments. The interventions of

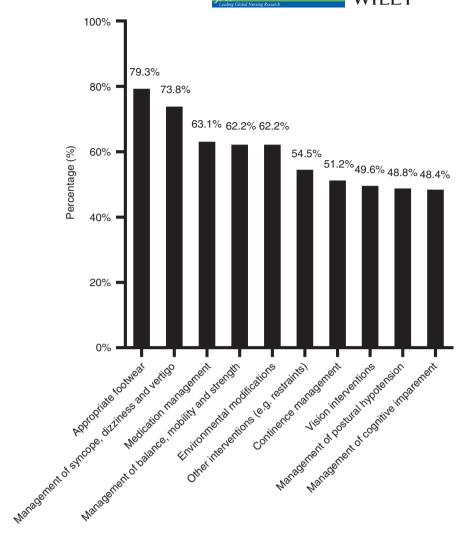**FIGURE 1** Distribution of multiple interventions for falls in routine practice

TABLE 3 Multiple falls interventions in medical and surgical wards

Intervention	Medical wards (%)	Surgical wards (%)	χ^2	p-value
Environmental modifications	25,243 (62.1)	17,383 (62.3)	0.22	0.636
Medication management	25,696 (63.2)	17,538 (62.9)	2.45	0.118
Management of balance, mobility and strength	25,178 (70.0)	17,472 (62.6)	3.04	0.081
Management of cognitive impairment	19,618 (48.3)	13,557 (48.6)	0.63	0.426
Continence management	20,701 (51.0)	14,356 (51.5)	1.71	0.192
Management of postural hypotension	19,686 (48.5)	13,721 (49.2)	3.53	0.060
Management of syncope, dizziness and vertigo	30,402 (74.8)	20,180 (72.3)	53.20	<0.001
Vision interventions	19,975 (49.2)	13,983 (50.1)	6.07	0.014
Appropriate footwear	32,335 (79.6)	22,005 (78.9)	5.07	0.024
Other interventions (e.g. restraints)	21,901 (53.9)	15,456 (55.4)	14.95	<0.001

Note: Chi-square test.

cognitive therapy, toileting assistance, the assessment and management of dizziness and vertigo, the minimization of asthma triggers, education concerning medication use and the use of safe footwear were significantly more common in medical wards than surgical wards. Elevation of the head of the bed and assessments and referrals were significantly more common in medical wards. In medical and surgical wards, healthcare professionals were most likely to

report ensuring the use of safe footwear (97.1%) to address factors related to feet and footwear and were most likely to indicate keeping the floor surface clean and dry (96.0%) based on environmental evaluations. It is possible that not all patients with cognitive impairment and orthostatic hypotension received falls prevention interventions that matched their specific falls risk factors. In total, 51,044 nurses reported assessing cognitive impairment, but only 68.2% to

TABLE 4 Multifactorial falls prevention in medical and surgical units

Risk factor assessments	Multifactorial interventions	All n (%)	Medical wards	Surgical wards	p-value
Balance, mobility and strength limitations (N = 55,917)	Use of walking aids	50,583 (90.5)	30,444 (90.4)	20,139 (90.6)	0.478
	Exercise and physical training	41,436 (74.1)	25,011 (74.3)	16,425 (73.9)	0.301
Cognitive impairment (N = 51,044)	Delirium management	39,959 (78.3)	23,937 (78.4)	16,022 (78.2)	0.556
	Cognitive therapy	34,816 (68.2)	25,540 (83.6)	9276 (82.7)	<0.001
	Observation and supervision	35,178 (68.9)	20,963 (68.6)	14,175 (69.1)	0.224
Continence (N = 42,384)	Toileting assistance	34,618 (81.7)	21,319 (82.1)	13,299 (80.9)	0.002
	Use of an indwelling catheter	34,108 (80.5)	20,986 (80.8)	13,122 (79.9)	0.014
Orthostatic hypotension (N = 52,356)	Monitoring of postural blood pressure	46,846 (89.5)	28,083 (89.7)	18,763 (89.1)	0.029
	Medication review	37,577 (71.8)	22,553 (72.0)	15,024 (71.4)	0.085
	Elevation of the head of the bed	36,086 (68.9)	21,318 (68.1)	14,768 (70.1)	<0.001
Syncope, dizziness and vertigo (N = 52,165)	Assessment and management of dizziness and vertigo	48,240 (92.5)	29,586 (92.8)	18,654 (91.9)	<0.001
	Minimization of asthma triggers	44,801 (85.9)	27,472 (86.2)	17,329 (85.4)	0.007
Medication (N = 47,836)	Medication review	41,716 (87.2)	25,144 (87.3)	16,572 (87.0)	0.370
	Education concerning medication use	43,684 (91.3)	26,395 (91.7)	17,289 (90.8)	0.001
Impaired vision (N = 46,036)	Observation and supervision	40,266 (87.5)	24,386 (87.4)	15,880 (87.5)	0.771
	Assessments and referrals	33,983 (73.8)	20,411 (73.1)	13,572 (74.8)	<0.001
	Provision of adequate lighting	41,568 (90.3)	25,220 (90.4)	16,348 (90.1)	0.259
Environment (N = 44,097)	Maintenance of a clean and dry floor surface	42,313 (96.0)	25,392 (96.1)	16,921 (95.7)	0.022
	Installation of rails in bathrooms and corridors	39,173 (88.8)	23,490 (88.9)	15,683 (88.7)	0.432
	Locking of bed brakes	38,629 (87.6)	23,066 (87.3)	15,563 (88.0)	0.032
Feet and footwear (N = 38,426)	Use of safe footwear	37,298 (97.1)	22,256 (97.6)	15,042 (96.3)	<0.001

Note: Chi-square test.

68.9% of the nurses indicated providing cognitive therapy or observation and supervision as preventive interventions to decrease the risk of falling. Among the 52,356 nurses who reported evaluating orthostatic hypotension, the most commonly reported intervention was the monitoring of postural blood pressure (89.5%), and nearly 30% reported providing no intervention. This finding also applied to patients with incontinence. The nurses were most likely to report toileting assistance (81.7%) and the use of an indwelling catheter (80.5%) as effective strategies for incontinence.

5 | DISCUSSION

Prior to this study, data concerning the extent to which falls risk factors were assessed and targeted evidence-based prevention was implemented for patients in medical and surgical units in Chinese hospitals were limited. Gathering this information may assist in providing guidance for future improvements and assistance for integrating falls prevention into daily care. The results of this study indicate that nurses are generally concerned about falls risk factors

and prevention for their patients; however, there is still significant room for improvement.

In our study, assessing falls risk factors was more common in medical units than surgical units. The most commonly evaluated factors were balance, mobility and strength (81.6%); orthostatic hypotension (76.4%); syncope, dizziness and vertigo (76.1%) and cognitive impairment (74.5%). The least commonly evaluated factor was feet and footwear (56.1%). Evidence-based guidelines that healthcare providers are committed to implementing every day promote excellence in falls prevention interventions in hospitals. Each patient has a different combination of falls risk factors; therefore, a standardized assessment with multiple components should be a part of a personalized, multifactorial prevention intervention (Australian Commission on Safety and Quality in Healthcare, 2009; Ganz et al., 2013; Registered Nurses Association of Ontario, 2017). Notably, common fall-related factors, such as medications, continence, impaired vision and the environment, were not assessed in more than 20% of medical and surgical patients. This finding is likely related to the falls risk evaluation tools used in medical and surgical care and possibly unit-specific factors. The following two valid

assessment tools have been the most commonly used: the Morse Fall Scale (including items concerning a history of falling, secondary diagnosis, ambulatory aid, IV/heparin lock, gait/transferring, and mental status) (Morse et al., 1989) and the STRATIFY (including items concerning transfer/mobility, history of falls, vision, agitation and toileting) (Oliver et al., 1997). However, no assessment tool covers all falls risk factors. Many other risk factors that are not listed in an assessment tool should be considered complementary clinical judgements. In fact, medical and surgical units may need to add unit-level risk factors as a part of their standardized assessment (Queensland Goverment, 2013).

Regarding multiple falls interventions, Shever et al. found that most nurses (90%) reported the use of bed alarms, followed by rounds (70%), sitters (68%) and room changes close to nurses' stations (56%) in medical-surgical units in the United States (Shever et al., 2010). In our study, ensuring safe footwear (79.3%) and managing syncope, dizziness and vertigo (73.8%) were the most frequent prevention interventions, while the management of postural hypotension (48.8%) and cognitive impairment (48.4%) were the least frequent. Another finding was that the management of syncope, dizziness and vertigo was more common in medical units, while other interventions (e.g. restraints) were more common in surgical units. Each unit type had specific patient-centred risk factors and interventions for falls prevention (Tzeng &Yin, 2017). We speculate that in China, nurses and their coordinators have a high level of falls prevention knowledge and skills for specific patients, such as the management of balance, mobility and strength and medication management, and may implement these falls prevention strategies with medical patients more generally. A further explanation may be related to the treatment for medical conditions, which may constitute multiple falls prevention strategies for special patients (e.g. impaired vision or continence) (Avanecean et al., 2017; Ganz et al., 2013).

Evidence from hospital settings indicates the wider benefits of multifactorial approaches to preventing falls based on falls screening or assessment (Cameron et al., 2012; Morris & O'Riordan, 2017). In our study, the healthcare professionals were most likely to report the use of safe footwear (97.1%) to address factors related to feet and footwear and were most likely to report maintenance of a clean and dry floor surface (96.0%) based on environmental evaluations. In addition, more than 85% of the implemented multifactorial prevention interventions targeted more risk factors. These findings are consistent with the published recommendations according to the best practice guidelines for falls prevention in hospitals (Australian Commission on Safety and Quality in Healthcare, 2009; Ganz et al., 2013; Registered Nurses Association of Ontario, 2017). Notably, the nurses were most likely to report toileting assistance (81.7%) and the use of an indwelling catheter (80.5%) as effective strategies for incontinence. Managing problems with incontinence should be a part of multifactorial interventions for preventing falls, such as toileting assistance, timed voiding, habit retraining, prompted voiding, consulting with a continence adviser, the use of continence aids or environmental changes (Australian Commission on Safety and Quality in Health Care, 2009; Registered Nurses Association

of Ontario, 2017). Importantly, hospital caregivers should be aware that the aim of incontinence management (Australian Commission on Safety and Quality in Healthcare, 2009) is to address incontinence factors and promote the continence status of the patient rather than the use of an indwelling catheter. A multifactorial approach to falls prevention should be a part of the daily care for hospital patients (Avanecean et al., 2017).

The performance of multifactorial interventions in medical and surgical wards was considerably high, but still incomplete, in terms of prevention interventions that matched specific falls risk factors, including cognitive therapy (68.2%), observation and supervision (68.9%) and no intervention (30%). Multifactorial interventions in medical and surgical wards were reported as inconsistently implemented, possibly contributing to poor compliance with falls guidelines in general. Second, although various falls guidelines for hospitals have been published, it was not until 2011 that China released its only guideline, which has not been updated (Cheng et al., 2011). Best practice guidelines represent the currently best known approaches to prevent falls in hospitals and need to include standardized multifactorial interventions that address specific risk factors for each patient (Mathew, 2021). Importantly, each patient requires a different set of interventions. In addition to using a multifactorial approach to falls prevention, there is a need to customize prevention interventions at the unit level (e.g. respiratory unit, cardiology unit, orthopaedic unit and post neurosurgical unit) based on common health problems and circumstances.

5.1 | Strengths and limitations

One strength of this study is that it is a large multicentre study of Chinese medical and surgical units, which represents a first step towards adhering to the Chinese Standard for Preventing Falls in Hospitals formulated by the Nursing Management Committee of the Chinese Nursing Association aiming to promote quality and policy improvements. To make the study more representative, we surveyed numerous primary, secondary and tertiary hospitals. Another strength is that the classification of falls risk factor assessments and targeted multifactorial interventions used in this study was based on best practice guidelines for falls prevention, thus ensuring satisfactory validity and reliability. Our reliance on the recall of nurses in a retrospective data design is a potential limitation; it is possible that there were nurses who worked in medical and surgical units who performed falls prevention interventions but did not report them in the study. Future studies should consider more data collection methods to obtain information regarding evidence-based falls risk assessment and prevention strategies in daily clinical practice.

6 | CONCLUSIONS

In summary, we found that nurses were generally concerned about falls risk factors and prevention for their patients; however, limited

attention had been focused on continence, feet and footwear assessment and the management of cognitive impairment. The performance of multifactorial interventions in medical and surgical wards was considerably higher but still incomplete, suggesting that more work should be performed to improve the best practices for identifying falls risk factors and implementing targeted falls prevention strategies in Chinese hospitals.

CONFLICT OF INTEREST
The authors have no conflicts of interest to declare.

AUTHOR CONTRIBUTIONS
All authors participated in the work of this study. Xinjuan Wu, Yining Zheng, Jing Zhao, Yilan Liu, Baoyun Song, Hongmei Gao, Chao Sun, Hui Yang, Ying Wang, Kuiqi Song, Yan Yang, Xiaorong Luan, Xianxiu Wen, Xin Yin, Adan Fu, Yinghua Cai, Liling Xie and Yaling Li coordinated nurses enrolment and data collection for their respective province and cities. Zejuan Gu was the principal investigator who initiated and designed the research. Kewen Mei compled the literature review. Peng Chen and Lixia Xia performed the statistical analyses. Lixia Xia and Peng Chen cowrote drafts of the manuscript. All authors approved and accepted the final version of the manuscript. Xinjuan Wu, Yining Zheng, Zejuan Gu, Rong Wang and Zheng Lin are guarantors.

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