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Fall prevention practices among nurses and the factors that influence them: a Hungarian study

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Abstract
Introduction: Nurse activities play an important role in the prevention of falls in old age, both in home care and institutional care.
Objective: The aim of this study is to investigate nurses' falls prevention practices and the factors influencing them.
Methods: A cross-sectional descriptive study was conducted between December 1, 2022, and February 16, 2023, using a self-designed questionnaire that included a knowledge test of falling and an attitude scale related to falling.
Results: 442 nurses working in health or social care in Csongrád-Csanád county, Hungary, participated in the survey. Significant differences in fall prevention practices were found by sex ($p = 0.03$), age ($p = 0.02$), work experience ($p = 0.03$), fall experience ($p = 0.001$), information received at work ($p < 0.001$), presence of a risk assessment scale ($p < 0.001$), and presence of a fall prevention protocol ($p < 0.001$). Positive correlations were detected between practical activity and attitude ($r = 0.42$, $p < 0.001$), and knowledge and attitude ($r = 0.40$, $p < 0.001$). Nurses' fall prevention activities were significantly influenced by their attitudes towards falls ($\beta = 0.43$, $p < 0.001$).
Conclusion: Our study highlights the need to improve fall prevention practice with the help of further education and case discussions. This may improve attitudes and communication within the team regarding fall prevention.

Keywords: Fall prevention; Nurses; Practice

Introduction

Falls in old age can be associated with serious health consequences, including potentially fatal outcomes. According to the Global Burden of Disease study (James et al., 2020), which demonstrates data between 1990 and 2017, the age-standardised incidence of falls out of 100,000 people was 2,238. The highest incidence was observed in central Europe (11,434), with an even higher rate in Hungary (11,783). The mortality rate derived from falls was globally 9.2 (8.5–9.81), while in Hungary it was 9.4 (8.8–9.9). According to the World Health Organization (WHO, 2021), falls cause approximately 646,000 deaths annually, with over 37 million fall injuries requiring medical attention. In Hungary, falls are the second leading cause of accidents in primary care, whereas slips are the sixth leading cause (Bényi et al., 2020). Adamik et al. (2022) found that almost two-thirds of falls in Hungarian hospitals occurred in individuals 65 years and older, with an even higher rate in nursing wards. Furthermore, a study conducted in nursing homes revealed that falls occur on a monthly basis (Boros and Balogh, 2020). Fall injuries result in significant medical costs. According to Florence et al. (2018), the treatment of fatal and non-fatal injuries cost approximately $50 billion in the United States in 2015. The researchers predict that these costs could continue to increase in the upcoming years as the number of elderly residents also continues to increase. In addition to the negative effects of falls on the health of elderly individuals, there are also psychological and social complications that can result in recurring falls (Ang et al., 2020; Petersen et al., 2022). These data also indicate that preventing falls in the elderly should be a priority in both institutional and home care.

Today's population is an ageing population (WHO, 2022), which means that healthcare providers, including nurses, must devote a significant part of their work to improving the health of older people and meeting their care needs. Several studies have demonstrated that nurses in various care settings have the potential to prevent falls in elderly people; activities and interventions carried out by nurses have been found to reduce the incidence of falls, rate of falls and complications after falls, and have a positive impact on older people's fall prevention behaviour (Albasha et al., 2023; Ojo and Thiamwong, 2022; Ong et al., 2021). Their guiding principle is to identify an elderly person at high risk of falling in an acute or chronic care facility or in the elderly person's own home, using a thorough assessment. The assessment is supported by standardized risk assessment tools that aim to identify people at high risk of falling (Park, 2018) to minimize the occurrence of avoidable

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falls using nursing interventions. Nurses perceive creating a safe environment, providing assistance during mobility, using safety and walking aids, educating patients and their families on safe environments and potential adverse effects of medications to be effective interventions in the prevention of falls during the care of elderly people (Garcia et al., 2022; Innab, 2022). In addition, communication within the health care team regarding fall prevention strategies and participation in fall prevention trainings are also considered crucial (Bok et al., 2016; Garcia et al., 2022).

Preventing falls among the elderly is a huge challenge for nurses and other healthcare professionals. Previous studies have identified the lack of knowledge among healthcare staff regarding fall risk factors and prevention strategies as a significant barrier to implement fall prevention measures. On the other hand, nurses' attitudes toward falls, fall prevention, and what they consider to be good practices in fall prevention can influence the implementation of fall prevention activities (Cho and Jang, 2020; Han et al., 2020; Hasim et al., 2023). Several studies have reported that nurses perceive falls as unavoidable and that existing strategies are either ineffective or not feasible in their field of care (Cho and Jang, 2020; Hasim et al., 2023; Kim et al., 2015). On the positive side, nurses have shown interest in fall prevention and are willing to participate in trainings (Han et al., 2020; Quang-Tri et al., 2020) to identify risk factors and apply prevention strategies more effectively.

Assessing the level of knowledge, attitude, and practice is the first step in identifying weaknesses in fall prevention. Therefore, the objectives of this study were to assess the fall prevention practices of Hungary's nurses and to identify the factors influencing them.

Materials and methods

Study design

The present cross-sectional descriptive study identifies the activities of nurses working in different care settings in a region of Hungary to prevent falls among elderly people. The study analyses the possible factors influencing fall prevention activities, including general characteristics, main characteristics related to falls at work, and the knowledge and attitudes of nurses towards falls and their prevention.

Participants in the study

Nurses, nursing assistants, and social care workers were enrolled in the study who were actively involved in healthcare or social care of the elderly in a county in the Southern Great Plain region of Hungary at the time of the study. The inclusion criteria included that the participants had achieved a minimum level 4 in the European Qualifications Framework (EQF) for health or social care.

Measurements

In the study, a structured questionnaire was used that included seven items to collect the general characteristics of the participants: sex, age, education, work experience, location of care, care system, and type of care. The study evaluated six main characteristics related to falls among participants. These included: experience of falls at work, frequency of experienced falls (often defined as experiencing them daily to once a month, rarely defined as experienced once every 2 months to once in every six months, and almost never or never defined as experienced once a year or never experienced a fall), information received at work, participation in fall prevention training, presence of a fall prevention protocol, and presence of fall risk assessment scale.

To evaluate the level of knowledge regarding falls, we applied Kim et al.'s (2015) knowledge test consisting of 15 items. The test covered the types of falls, their prevalence, potential complications, and risk factors. Each item was scored 1 point for a correct answer and 0 point for an incorrect or unknown answer. The total score ranged from 0 to 15 points. If the total score was below 8 points, we considered the participant to have low level of knowledge; if the score was between 8 and 11.5 points, we considered the participant to have moderate level of knowledge; and if the score was above 12 points, we considered the participant to have excellent level of knowledge.

To evaluate attitudes, Kim's (2011) 13-item attitude scale was used. The scale ranged from 1 (strongly disagree) to 5 (strongly agree), resulting in a total score between 13 and 65 points. Scores below 32.5 points indicated negative attitudes, while scores above 32.5 points indicated positive attitudes.

To assess nurses' fall prevention practices, a 13-item scale was applied. This scale included fall prevention activities from various relevant literature (Cho and Jang, 2020; Han et al., 2020; Quang-Tri et al., 2020) and the Nursing Intervention Classification (Butcher et al., 2018). These items described nursing interventions that form the foundation of fall prevention for elderly individuals at all levels of care in both social and healthcare settings. The scale ranges from 13 to 65 points. A five-point Likert scale was used, with 1 indicating strong disagreement and 5 indicating strong agreement. Scores were classified into a low (less than 32.5 points), moderate (33–49 points), or good (49 points or more) level of fall prevention practices. The scales' Cronbach's alpha ranged from 0.67 to 0.87.

Data collection

The survey was conducted between December 2022 and February 2023. The questionnaires were sent online to nurses, social care workers, and carers in Csongrád-Csanád County via the official e-mail system of the Csongrád-Csanád County Regional Organisation of the Hungarian Chamber of Health Care Professionals (MESZK) and the Csongrád-Csanád County Institutions of the Directorate General of Social and Childcare. According to the MESZK database, a total of 1,825 nurses were active in the region. The minimum number of elements in the study was set at 318, based on Yamane's formula. In an invitation letter, we explained the purpose of the survey and informed the participants that the data collection was anonymous and voluntary and attached a link to our questionnaire. The link was sent to the nurse 3 times and the questionnaire was active for two and a half months, after which the opportunity to complete the questionnaire was closed. We received 453 completions as a response to our invitation, and 442 completions were included in the survey analysis. 11 questionnaires were excluded for incomplete completion or because they did not meet the inclusion criteria.

Statistical analysis

Statistical analysis was performed using IBM SPSS 24.0 software. Descriptive statistics were used to evaluate the empirical data. During the analysis of our dataset, two-sample *t*-tests, correlations, and analysis of variance with Bonferroni *post-hoc* test were used. Hierarchical regression analysis was also used to identify factors influencing subjects' fall prevention practices.

Characteristics of the participants

The general and main characteristics of the participants are summarised in Table 1 (N = 442).

Table 1. Characteristics of the sample (*N* = 442)

General characteristics			Main characteristics		
	N	%		*N*	%
Sex			Experienced any falls at workplace		
Male	32	(7.2)	Yes	389	(88.0)
Female	410	(92.8)	No	53	(12.0)
Age			Frequency of elderly's falls at workplace		
<35	124	(28.0)	Frequently	197	(44.5)
35–44	86	(19.5)	Rarely	162	(36.7)
45–54	170	(38.5)	Almost never or never	67	(15.2)
>55	62	(14.0)	Received information on fall prevention		
Professional education			Yes	365	(82.5)
EQF 4	83	(18.8)	No	77	(17.5)
EQF 5	219	(49.5)	Participated in fall prevention training		
<EQF 6	140	(31.7)	Yes	167	(37.7)
Care sector			No	275	(62.3)
Healthcare	337	(76.2)	Presence of a fall risk assessment scale		
Social care	105	(23.8)	Yes	208	(47.0)
Form of care			No	167	(37.8)
Acute care	262	(59.3)	Uncertain	67	(15.2)
Chronic care	180	(40.7)	Presence of a fall prevention protocol		
Professional experience			Yes	199	(45.0)
<5 years	160	(36.2)	No	158	(35.7)
5–20 years	161	(36.4)	Uncertain	85	(19.3)
<20 years	121	(27.4)	Functioning fall-reporting system		
Workplace localization			Yes	277	(62.7)
County seat	296	(60.9)	No	95	(21.5)
Other town	173	(39.1)	Uncertain	70	(15.8)

Note: N – absolute frequency, %.

Results

Fall prevention activities in nursing practice

Table 2 presents the statements regarding daily fall prevention activities and their level of achievement. Based on feedback from the nurses, activities implemented on the highest level are related to tasks of educating elderly individuals on mobility. The elderly are reminded to ask for help moving if they feel tired or dizzy (4.74 ± 0.71), and instructed on how to use the walking aids correctly (4.57 ± 0.79). The removal of potential hazards in the elderly person's environment was a high priority for the nurses (4.58 ± 0.74). Other interventions, such as checking the footwear of the elderly during movement, discussing fall prevention strategies within the team, and using a fall risk assessment scale, are the least commonly used.

On the survey scale, 0.7% of nurses (*N* = 3) demonstrated a low level of fall prevention practices, 16.5% (*N* = 73) demonstrated a moderate level of practices, and 82.8% (*N* = 366) demonstrated good practices.

Analysis of fall prevention practices by general and main characteristics

Gender differences were observed in the use of fall prevention interventions, with women using them at a higher rate than men ($p = 0.033$) (Table 3). Age was also found to be a significant factor ($p = 0.02$), with nurses over 55 years of age being more engaged in fall prevention activities than those under 35 years of age. Furthermore, nurses who had been practising for more than 20 years engaged in more prevention activities ($p = 0.036$) compared to their colleagues with 5–20 years of experience.

Table 2. Nurses' fall prevention activities in daily practice presented from the highest level of implementation to the lowest (*N* = 442)

Fall prevention activities	*N* (%)					M ± SD
	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	
5. I remind the elderly person that if they are tired or dizzy, they should ask for help in moving.	347 (78.5)	76 (17.2)	18 (4.1)	–	1 (0.2)	4.74 ± 0.55
13. I remove the potential source of danger from the elder's environment.	312 (70.6)	83 (18.8)	39 (8.8)	6 (1.4)	2 (0.5)	4.58 ± 0.74
11. I educate the elderly on the correct use of stick and walking frame.	314 (71.0)	85 (19.2)	32 (7.2)	4 (0.9)	7 (1.6)	4.57 ± 0.79
4. I always educate patients to ask for help if they are tired or dizzy,	300 (67.9)	104 (23.5)	33 (7.5)	1 (0.2)	4 (0.9)	4.57 ± 0.71
7. I encourage the elderly to wear glasses and hearing aids to stay safe while moving.	295 (66.7)	103 (23.3)	34 (7.7)	6 (1.4)	4 (0.9)	4.54 ± 0.77
9. I encourage the elderly to improve their mobility.	271 (61.3)	120 (27.1)	43 (9.7)	6 (1.4)	2 (0.5)	4.48 ± 0.72
6. I check the height of the bed and armchair and adjust them to the client's needs.	276 (62.3)	102 (23.1)	54 (12.2)	6 (1.4)	4 (0.9)	4.45 ± 0.82
10. I make sure that the lighting in the elderly person's environment (room, bathroom, and corridor) is bright enough.	269 (60.9)	113 (25.6)	49 (11.1)	7 (1.6)	4 (0.9)	4.44 ± 0.82
8. I check the flooring in the elderly's environment (room, toilet, and corridor) for slipperiness.	265 (60.0)	111 (25.1)	42 (9.5)	13 (2.9)	11 (2.5)	4.37 ± 0.94
1. I inform patients and their carers with a high risk for falling on risk factors for falls.	230 (52.0)	136 (52.0)	57 (12.9)	13 (2.9)	6 (1.4)	4.29 ± 0.89
3. I make sure that clients with a high risk for falling wear shoes that are non-slippery and of the right size.	228 (51.6)	106 (24.0)	75 (17.0)	16 (3.6)	17 (3.8)	4.16 ± 1.07
12. I discuss the fall prevention strategy within the team.	193 (43.7)	107 (24.2)	87 (19.7)	29 (6.6)	26 (5.9)	3.93 ± 1.19
2. I use a fall risk assessment scale to assess risk for fall.	164 (37.1)	84 (19.0)	92 (20.8)	39 (8.8)	63 (14.3)	3.56 ± 1.42

Note: N – absolute frequency (%), M – mean; SD – standard deviation.

Table 3. Fall prevention activities along general characteristics (*N* = 442)

General characteristics			
Variable	M + SD	Test	*p*-value
Sex			
Male	53.18 ± 9.29	$t = -2.223$	0.033
Female	56.94 ± 7.79		
Age			
<35 [a]	55.34 ± 8.76	$F = 3.329$	0.02
35–44 [b]	56.19 ± 8.65	*a < d	
45–54 [c]	56.98 ± 7.50		
>55 [d]	59.66 ± 7.95		
Professional education			
EQF 4	57.60 ± 7.99	$F = 0.718$	0.488
EQF 5	56.51 ± 7.95		
<EQF 6	56.66 ± 7.96		
Care sector			
Healthcare	56.45 ± 7.99	$t = 1.20$	0.23
Social care	56.97 ± 7.92		
Form of care			
Acute care	56.36 ± 7.99	$t = -0.749$	0.45
Chronic care	56.97 ± 7.92		
Professional experience			
<5 years [a]	56.36 ± 7.99	$F = 3.336$	0.032
5–20 years [b]	55.81 ± 8.61	*b < c	
<20 years [c]	58.20 ± 6.77		
Workplace localization			
County seat	57.17 ± 7.81	$t = 1.20$	0.23
Other town	56.51 ± 8.00		

Note: M – Mean; SD – standard deviation; *F* – one-way ANOVA; * *post-hoc* test (Bonferroni); a, b, c, d –variable; *t* – Welch *t*-test.

A significant difference was found in the score of fall prevention activities among the main characteristics regarding the frequency of falls at work ($p = 0.014$) (Table 4). Nurses who experienced falls at work frequently (even daily) had a lower score for fall prevention activities than those who sometimes or almost never experienced falls at work, according to the *post-hoc* test. The results indicated that nurses who received information on fall prevention at their workplace scored higher on the scale than those who did not receive information ($p = 0.009$). Additionally, a significant difference was found in the scores between nurses who attended continuing education and those who did not ($p = 0.002$). There was also a significant difference in the availability of the fall risk assessment scale at the nurse's workplace ($p < 0.001$). Based on the *post-hoc* test, nurses who did not have a fall risk assessment scale present in their workplace scored significantly lower on preventive interventions than those who did have the scale available. The test revealed a significant difference ($p = 0.001$) in the presence of the fall prevention protocol. *Post-hoc* tests indicated higher scores for fall prevention activities when the protocol was present in the workplace, and lower scores when the nurse reported the absence of a fall prevention protocol or was uncertain of its existence.

Table 4. Fall prevention activities along main characteristics ($N = 442$)

Main characteristics			
Variable	M + SD	Test	*p*-value
Experienced any falls at workplace			
Yes	56.64 ± 7.94	$t = -0.153$	0.87
No	56.83 ± 8.16		
Frequency of elderly's falls at workplace			
Frequently [a]	55.45 ± 8.37	$F = 4.308$	0.01
Rarely [b]	57.50 ± 7.76	*a < b, c	
Almost never or never [c]	57.93 ± 6.96		
Received information on fall prevention			
Yes	57.16 ± 7.71	$t = 2.266$	0.009
No	54.31 ± 8.71		
Participated in fall prevention training			
Yes	58.16 ± 7.46	$t = 3.10$	0.002
No	55.78 ± 8.13		
Presence of fall risk assessment scale			
Yes [a]	58.23 ± 6.92	$F = 8.595$	<0.001
No [b]	54.88 ± 8.88	*b < a	
Uncertain [c]	56.25 ± 8.31		
Presence of fall prevention protocol			
Yes [a]	58.14 ± 7.00	$F = 7.04$	0.001
No [b]	55.98 ± 8.88	*a > b, c	
Uncertain [c]	54.65 ± 8.31		
Functioning fall-reporting system			
Yes	57.22 ± 7.89	$F = 1.867$	0.156
No	55.92 ± 8.24		
Uncertain	55.48 ± 7.74		

Note: M – Mean; SD – standard deviation; *F* – one-way ANOVA; * *post-hoc* test (Bonferroni); a, b, c –variable; *t* – Welch *t*-test.

Correlation between knowledge, attitudes, and practices related to fall prevention

The results related to levels of knowledge, attitudes, and practical activities regarding fall prevention (as assessed by the scales) are summarised in Table 5. During our analysis, a positive correlation was found between knowledge and attitude ($r = 0.403$, $p < 0.001$) and between attitude and fall prevention practice ($r = 0.426$, $p < 0.001$).

Table 5. Nurses' level of knowledge, attitude, and practices related to fall prevention ($N = 442$)

Variables	Items	M ± SD	Min–Max	Interpretation
Knowledge	15	10.16 ± 3.07	0–15	Moderate
Attitude	13	48.03 ± 6.03	13–65	Positive
Prevention activity	13	56.66 ± 7.96	13–65	Good

Note: M – mean, SD – standard deviation.

Impact of general and main characteristics, and attitude on prevention activities of the fall

A hierarchical multilevel regression analysis was used to determine how the general and main characteristics of nurses influenced their fall prevention practice (Model 1). The knowledge and attitude variables were included in the second model. These findings are presented in Table 6.

In the first model, 10.1% of the variables evaluated influenced nurses' fall prevention practices. In the model, gender ($\beta = 0.12$, $p = 0.005$), age ($\beta = 0.18$, $p < 0.001$), workplace experience of falls ($\beta = -0.14$, $p = 0.002$), presence of falls risk assessment scale ($\beta = -0.14$, $p = 0.005$), and presence of protocol ($\beta = 0.13$, $p = 0.011$) were identified as significant predictor variables.

Additionally, nurses' attitudes had a significant effect on fall prevention activities ($\beta = 0.42$, $p < 0.001$) in the second model.

The second model had an explanatory power of 27.6%, which was a 17.5% increase compared to the first model.

Table 6. Influence of participants' general and main characteristics, knowledge, and attitudes on fall prevention activities (*N* = 442)

Variables	Model 1					Model 2				
	B	SE	β	*t*	*p*	B	SE	β	*t*	*p*
Constant	48.21	2.00		24.10	<0.001	20.85	3.2		6.51	<0.001
Sex [1]	3,89	1.39	0.12	2.79	0.005	3.69	1.25	0.12	2.95	0.003
Age	0.13	0.03	0.18	4.01	<0.001	0.14	0.03	0.19	4.83	<0.001
Experienced any fall at the workplace [2]	–2.20	0.72	–0.14	–3.04	0.002	–1.54	0.65	–0.09	–2.36	0.018
Presence of fall risk assessment scale [3]	–2.39	0.86	–0.14	–2.83	0.005	–2.41	0.75	–0.14	–3.18	0.002
Presence of a fall prevention protocol [5]	2.1	0.82	0.13	2.56	0.011	2.09	0.73	0.13	2.83	0.005
Attitude						0.55	0.06	0.42	10.32	<0.001
F(p)	10.88 (<0.001)					29.03 (<0.001)				
R^2	0.11					0.286				
Adjusted R^2	0.101					0.276				

Note: Dummy variables' references: [1] Female = 0; [2] Frequently = 0; [3] No = 0; [5] Yes = 0.

Discussion

In this study, we investigated the fall prevention practices of nurses and the factors that influence them in Hungary. Our study involved nurses and caregivers working in health and social care who attend to the elderly. Our results demonstrated that nurses are committed to implementing fall prevention activities in their daily work and that practical steps are applied to a good level (87.07%). Previous studies in Korea have also concluded that nurses are good practitioners of fall prevention activities. Their results show that nurses use fall prevention activities at a rate of 82.3% in hospital wards and 86.14% in long-term care facilities (Cho and Jang, 2020; Han et al., 2020). In a study conducted among nurses who work in a particular hospital facility in Saudi Arabia, 90.4% of them demonstrated good practice in preventing falls (Ganabathi et al., 2017). In a similar study conducted by Hasim et al. (2023) in two teaching hospitals in Malaysia, an even higher percentage (92.3%) of nurses reported implementing preventive actions. In a study conducted in an Ethiopian institute, nurses' fall prevention activities were found to be at a lower level, with only 61.3% of nurses implementing good fall prevention practices (Negash, 2022). It is important to note that nurses' activities were assessed in different work settings and along different hypotheses, and therefore comparisons between these studies should be made with caution.

In the present study, nurses focused primarily on preventing hazards in the elderly's environment and emphasised the importance of asking for help when moving around and learning how to use walking aids for safe transport. In a study by Cho et al. (2020), nurses ranked fall prevention activities (20 items) according to how engaged they were in carrying out them in their work. The fall risk assessment was ranked only in the 18th position by nurses on this list. Unfortunately, this trend was also detected in our study, as the assessment of fall risk was not used frequently by nurses. A possible explanation for this could be the unavailability of assessment tools for nurses, as many nurses in our study reported that the scale was not available at their workplace, or they were uncertain or unaware of the availability of a risk assessment scale. In a study by Innab (2022), nurses rated fall risk assessment as the eighth most important activity of ten in the evaluation of the effectiveness of fall prevention interventions. In two previous studies, nurses reported not assessing the risk of falling (30.6% and 47.1% respectively) (Negash, 2022; Quang-Tri et al., 2020). In a study conducted in an emergency department (Davenport et al., 2020), 84% of the staff considered it necessary to assess the risk of falls for all elderly patients. However, half of the doctors and nurses spent only a maximum of two minutes screening for the risk of falls, and the other half spent five minutes.

In the present study, nurses reported a lack of coordination in fall prevention strategies within their team. However, preventing and managing falls requires close collaboration among nurses and interdisciplinary teams, both in institutional and in community care. Collaboration can be improved through team discussions on fall prevention and incidents, where all team members can learn about the common goal and their possible role in achieving it. Focused communication is essential to ensure awareness of the fall prevention plan, which can improve patient care quality and safety (Albasha et al., 2023; Bok et al., 2016).

Our research identified differences in fall prevention activities according to gender, age, and work experience. Nurses 55 years or older with more than 20 years of experience performed more fall prevention activities than their peers. A study in long-term care wards found that nurses with more than 20 years of experience did more fall prevention. They also had significantly better outcomes at a younger age (over 40) (Han et al., 2020). In other studies conducted in hospital wards, no significant differences were found in nurses' fall prevention activities, regardless of their age or work experience (Cho and Jang, 2020; Hasim et al. 2023). Significant differences were found in the main characteristics related to frequency of falls, information received at work, participation in training, presence of a fall risk assessment scale at work, and the existence of a fall prevention protocol.

In our study, we analysed the relationship between knowledge, attitudes and practical activities related to fall prevention. Our results revealed a strong correlation between knowledge and attitude, as well as between attitude and fall prevention activities. However, no correlation was detected between knowledge and nurses' fall prevention activities. These findings are consistent with the results of Cho and Jang's study (2020). Previous research also indicated a posi-

tive correlation between knowledge, attitudes toward falls, and prevention activities (Han et al., 2020; Hasim et al., 2023).

In this study, two hierarchical regression analyses were performed to identify the factors influencing fall prevention activities by nurses. The first model revealed that sex, age, experience with falls, and the availability of fall risk assessment scales and protocols at work significantly influenced fall prevention activities. The second model was complemented with variables of knowledge and attitude related to falling, where attitude significantly influenced the outcome. According to Han et al. (2020), the hierarchical regression model evaluating fall prevention activities among nurses working in long-term care facilities, age, fall prevention training, and attitudes towards falls significantly influence fall prevention. Negash (2022) focused on the influence of educational attainment, professional experience, fall frequency, and fall prevention training on hospital nurses' fall prevention activities. In this study, the frequency of falls experienced by nurses at work negatively affected fall prevention interventions. Previous studies concluded that there was no significant difference (Cho and Jang, 2020) or that the frequency of falls was positively correlated with the number of fall prevention interventions (Negash, 2022). Differences between studies may be due to differences in the infrastructure and human resources available in the participating areas. In a previous national study on fall prevention strategies, nurses identified significant shortages of equipment and staff as inhibiting factors (Boros and Balogh, 2020). Previous studies did not address the effect of availability of fall prevention protocols or risk assessment scales at the workplace. Our study confirms that nurses who have access to fall prevention protocols and fall risk assessment scales are more likely to implement fall prevention activities at a higher level during their daily practice.

One limitation of the survey is that the Hungarian Chamber of Health Care Professionals and the Directorate General of Social and Childcare newsletter followers received our call, and nurses who do not follow it (such as older age groups) did not respond to the call themselves. We should also be aware that our findings may be biased by the fact that respondents self-assessed their activities, and we see a need for a future study that would allow an external observer to assess the activities in practice.

Conclusion

Our study found that nurses have a good level of use of fall prevention activities, but that the use of the risk assessment scale and communication within the team needs to be improved in daily practice. It is evident that joint case discussions are necessary to investigate the potential causes of falls and identify potential solutions. In the study, nurses with more professional experience showed better fall prevention practices. Therefore, older colleagues with more professional experience can be an important resource for younger and less experienced colleagues as role models in fall prevention.

The presence of fall prevention protocols and risk assessment scales in the field has positively influenced the implementation of fall prevention practices in nursing, and we see a need to make them available to nurses as soon as possible.

This study has shown that higher levels of knowledge about falls are associated with more positive attitudes toward falls, and more positive attitudes have been associated with higher levels of fall prevention practice. Consequently, it is of paramount importance to provide nurses with training that focuses on the development of attitudes towards falls, in addition to knowledge of interventions to prevent falls.

Ethical approval

The National Medical Research Ethics Committee permitted the research (ETT TUKEB number: BMEÜ/2884- 1 /2022/ EKU).

Conflict of interest

The authors have no conflict of interest to declare.

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