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Nurses in the Loop of Fall Prevention

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ABSTRACT

Background: Nurses actively engage in patient care and play an important role in preventing patient falls. However, lack of knowledge, attitudes, and practices regarding fall prevention contribute to increased incidence of falls. **Objectives:** This study aims to determine the level of knowledge, attitudes, and practices on fall prevention among nurses. **Methods:** A quantitative design with a cross-sectional survey was used for this study. Nurses working in two teaching hospitals in Selangor were purposively selected (n=147). Data were collected via an online platform using an adapted instrument (α>0.70). Nurses in the current study demonstrated a good level of knowledge (M=16.26; +SD=2.48), positive attitude (M=86.86, +SD=9.54), and high level of practice (M=92.03; +SD=9.96). Moreover, a positive relationship was found between knowledge and attitude, knowledge and practice, and attitude and practice of nurses in fall prevention (p<0.05). On the other hand, nurses' knowledge and attitude differ significantly according to their work experience (p<0.05). In contrast, no significant differences were found between the socio-demographic characteristics and nurses' practice in fall prevention (p>0.05). **Results:** The results of the current study on the knowledge and attitudes of nursing staff in both hospitals may help to improve fall prevention practices. **Conclusion:** However, concern was raised that the importance and potential impact of falls on patient outcomes is underestimated, and future studies on a larger scale are recommended.

Keywords: Fall; Fall Prevention; Nurses; Patient Safety

INTRODUCTION

Meeting the safety needs of clients is one of the cornerstones of nursing care, which includes fall prevention. Falls occur frequently in hospitalized patients, especially in the elderly, patients with altered consciousness, and patients with balance disorders (CDC, 2017; Najafpour *et al.*, 2019; Ng *et al.*, 2022). A fall can negatively impact an individual's independence and quality of life, leading to injury, reduced mobility, loss of independence, and death (McConville & Hooven, 2021; Negash, 2022).

Falls are considered the most common safety event in hospitals and occur at a rate of 3–5 per 1,000 occupied bed days, with nearly 1 in 3 hospital patients falling (James *et al.*, 2020). An estimated 684,000 fatal falls occur each year, while approximately 37.3 million are serious enough to require medical attention (WHO, 2021). This can lead to an increased economic burden from medical costs and the need for social care (Ganabathi, Mariappan & Mustafa, 2017; Najafpour *et al.*, 2019). In addition, the major public health concern is that 4% of fall-related injuries result in serious patient outcomes, such as excessive bleeding, subdural hematoma, and death (WHO, 2021). At the local level, the incidence of falls and repetitive falls among the elderly in Malaysia has been reported to be 8.5 and 3.2 per 100 person-years, respectively (Ooi *et al.*, 2021). Reducing the number of falls in hospitals is therefore an important priority.

Falls can be prevented through proper risk assessment and monitoring. Client-related factors, environmental factors, and healthcare providers have been identified as risks (Ganabathi, Mariappan & Mustafa, 2017; Najafpour *et al*., 2019) that ultimately lead to negative outcomes for both clients and hospitals (McConville & Hooven, 2021; WHO, 2021; Negash, 2022). In addition, there are several fall prevention initiatives in the healthcare system. For example, Malaysia has developed the Malaysian Patient Safety Goals, which address the problem of falls through the Ministry of Health's Falls Prevention Program and Hospital Falls Prevention Policy (Ministry of Health Malaysia, 2018) and emphasize the critical role of nurses in fall prevention. In a study in Indonesia, it was seen that patient safety

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culture in hospitals depends on administration's commitment and skill to evaluate staff nurse awareness, identify improvement areas, analyze trends, and assess its impact with good reliability and validity. (Suryani, Letchmi, & Said, 2022).

The role of nurses in fall prevention is significant (Kafantogia *et al.*, 2017; King *et al.*, 2018). However, numerous findings suggest that nursing-related causes of falls in healthcare settings include a lack of fall management skills, inadequate assessment, noncompliance with protocols and safety practices, communication barriers, and an unsupportive physical environment (Ganabathi, Mariappan & Mustafa, 2017; Kafantogia *et al.*, 2017; King *et al.*, 2018; Cho & Jang, 2020; Han, Kim & Hong, 2020; James *et al.*, 2020; Chong *et al*., 2020). Differential outcomes in fall prevention knowledge, attitudes, and practices, as well as differences and relationships among these levels and demographic variables, also demonstrate the need to address this issue. Limited, fair, moderate, or high levels of knowledge in falls prevention among nurses with neutral, acceptable, favorable, or good attitudes and low, moderate, or good practices (Ganabathi, Mariappan & Mustafa, 2017; Cho & Jang, 2020; Han, Kim & Hong, 2020; James *et al.*, 2020). Furthermore, no significant relationships were found between knowledge, attitude, and practice (Lim & Yam, 2016; Kim, Jeon & Chon, 2015; Cho & Jang, 2020), and some results suggest a weak to strong positive significant relationship between these variables (Chong *et al.,* 2019; Han, Kim & Hong, 2020; James *et al.*, 2020). Work experience is significantly different from knowledge, attitude, and practice of fall prevention among nurses (Chong *et al.*, 2019; Cho & Jang, 2020; Han, Kim & Hong, 2020). However, insufficient local outcomes on fall prevention among nurses were found.

Fall prevention is a fundamental issue related to client safety concerns, and therefore the status of our nurses needs to be determined. We hope that the results of the study can be used strategically to improve the approach to fall prevention and meet the needs of all stakeholders, including clients, nurses, and the facility. The objectives of the study are as follows:

- To determine the level of knowledge, attitude, and practice in fall prevention among nurses in teaching hospitals.
- To determine the relationship between knowledge, attitude, and practice of fall prevention in teaching hospitals.
- To determine the difference between socio-demographic data (age, work experience, and highest level of nursing education) and nurses' knowledge, attitude, and practice regarding fall prevention in patients.

Null Hypothesis

There is no significant association between nurses' knowledge, attitude, and practice in fall prevention.

METHODOLOGY

To achieve the objectives of the study, a quantitative design with a cross-sectional survey was used. Two teaching hospitals in Klang Valley, Selangor, Malaysia, were selected as study sites because they provide health services to the surrounding community and serve as centers for learning and innovation in science and medicine. All participants were informed about the study, consented with full autonomy, and were kept anonymous. The data collected were protected throughout the process, from collection to publication. Nurses working in adult clinical settings and involved in routine nursing care on an ongoing basis were selected through purposive sampling (n=147). Data were collected using self-administered structured questionnaires and via the social media platforms WhatsApp and Telegram, which were chosen for Google Form dissemination because of physical limitations related to the COVID-19 pandemic.

Measures

The self-administered questionnaire includes four sections, including the knowledge, attitude, and practice instrument for fall prevention adopted from Ganabathi, Mariappan & Mustafa, (2017), with an alpha coefficient ranging from 0.70 to 0.96.

Section A: Sociodemographic Information

This section contained six closed-ended questions that included age, gender, the highest level of nursing education, work experience as a nurse, and the nursing department.

Section B: Knowledge of Fall Prevention

A total of 18 items with dichotomous questions cover a wide range of knowledge, from recognizing risk factors

for patient falls to identification. The total score ranged from 0 to 19, and the knowledge level was then classified as good, moderate, or poor.

Section C: Attitudes toward Fall Prevention

This section asked about respondents' attitudes toward fall prevention strategies. 20 Likert scale items were used, ranging from 1 (strongly agree) to 5 (strongly disagree). Total scores ranged from 0 to 20. Attitudes were then categorized as positive or negative.

Section D: Fall Prevention Practices

This section addresses all practices related to fall prevention. It consisted of 14 items on a Likert scale ranging from 1 (never) to 5 (always). The total score ranged from 0 to 14. Further categorization was then made into poor, moderate, and good practices.

Statistical Analysis

All raw data were cleaned, organized, and calculated using the Statistical Package for Social Sciences (SPSS) version 26. Descriptive statistics were generated for all variables, and values for measurements were presented as frequency, percentage, and mean + SD. Knowledge status was then classified as poor (score below 10), moderate (score of 11–14), and good (score of 15 and above); negative attitude (<50%) and positive attitude (>50%); poor (<40%), moderate (41–59%), and good practice (60% and above). As the data were not normally distributed, nonparametric tests were used. The relationship between nurses' knowledge, attitude, and practice was determined using Spearman-Rho correlation analysis, and simultaneous comparisons between sociodemographic data and nurses' knowledge, attitude, and practice were examined using the Kruskal-Wallis test. Statistical significance was defined as $p<0.05$ for all tests.

Ethical Consideration

The study was approved by the Research Ethics Committee of Universiti Teknologi MARA (UiTM), Malaysia on 3rd August, 2022 with reference number FERC/FSK/ MR /2022/0173.

RESULTS

A descriptive analysis was used to describe the demographic characteristics (n = 100) (Table 1). Most respondents were women (97%), while 3% were male nurses. Most of them are under 30 years old (51%), and the fewest are between 41 and 45 years old (1%). 33% have three to five years of work experience as nurses, while only 1% have worked more than 15 years. The majority (86%) have a diploma in nursing. Most nurses work in medical departments (29%) or in obstetrics (27%).

Table 1: The Demographic Characteristics of Participants (n = 100)

Socio Demographic Data		n (%)
Gender	Male	3 (3)
	Female	97 (97)
Age	Below 30 years old	51 (51)
	30-35 years old	43 (43)
	36-40 years old	5 (5)
	41-45 years old	1 (1)
Working Experience as A Nurse	Below 3 years	23 (23)
	3-5 years	33 (33)
	6-10 years	27 (27)
	11-15 years	16 (16)
	More than 15 years	1 (1)
The Highest Level of Nursing Education	Diploma in nursing	86 (86)
	Bachelor's degree in nursing	9 (9)
	Post-basic certificate / Advanced diploma	4 (4)
	Master's degree in nursing	1 (1)
Current Department	Medical Unit	29 (29)
	Surgical Unit	6 (6)
	Rehabilitation Unit	6 (6)
	Intensive Care Unit	11 (11)
	Cardiology Unit	18 (18)
	Obstetrics & Gynaecology Unit	27 (27)
	Emergency Department	3 (3)

The Level of Knowledge, Attitudes, and Practices Regarding Fall Prevention among Nurses

Table 2 summarizes the overall findings of the knowledge, attitude, and practice of nurses in our study on fall prevention. Nurses were found to have a good level of knowledge (M=16.26+ SD =2.48), positive attitude (M=86.86+ SD =9.54), and good practice (M=92.03+ SD =9.96) on fall prevention.

Table 2: The Level of Knowledge, Attitude, and Practices on Fall Prevention among Nurses

Variables	Mean (±SD)	Interpretation
Knowledge	16.26 (2.48)	Good
Attitude	86.86 (9.54)	Positive
Practice	92.03 (9.96)	Good

*Knowledge: <10, poor; 11-14, average; >15, good**
*Attitude: 50%, negative; >51%, positive***
*Practice: <40%, poor; 41-59%, moderate; >60, good. ****

The Level of Knowledge on Fall Prevention among Nurses

Figure 1 presents the categorical level of knowledge among nurses regarding patients' fall prevention. Majority of the nurses had good knowledge (78%) towards patients' fall prevention, followed by moderate knowledge (18%) and 4% had poor knowledge.

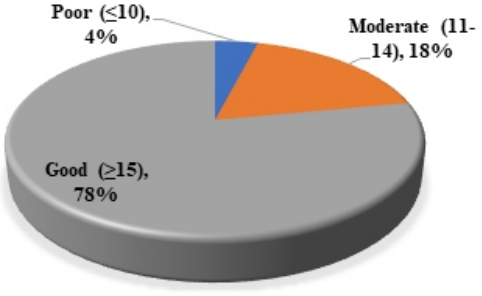

Figure 1: The Categorical Level of Knowledge among Nurses Regarding Patients' Fall Prevention

Table 3 summarizes the results on nurses' knowledge of patient fall prevention. 89% of nurses agreed that the incidence of falls is high, and 71% knew that there was a falls prevention team in the hospital. Meanwhile, 99% of nurses know that falls can affect patients' quality of life, and 98% of them know what happens when a patient falls. All nurses in our study agreed that the adapted Morse fall risk assessment tool helps nurses identify patients at risk for falls and that individuals with visual impairments are at higher risk for falls. In addition, most nurses (95%) agreed that hip fractures in the elderly are caused by falls. In contrast, only 58% of them agreed that depression was not associated with falls.

Table 3: Mean, Standard Deviation, Percentage of Knowledge Items

Knowledge Items	Correct Answer (%)	Mean (SD)
Recurrence rate is high among anyone who has already experienced a fall.	89	0.89 (0.31)
Is there a fall committee team in this hospital?	71	0.71 (0.46)
Do you know what happens when patient fall?	98	0.98 (0.14)
I always report the fall incident.	88	0.88 (0.33)
Modified Morse Fall Risk assessment tool is used to assists you to identify high risk patients.	100	1.00 (0.00)
Falls can affect quality of life for patients.	99	0.99 (0.10)

Falls can increase unnecessary acute care hospitalizations.	93	0.93 (0.26)
Completion of a fall risk assessment to identify those patients at risk for falling.	97	0.97 (0.17)
Nurses must collaborate with interdisciplinary team members and with patient/caregiver to be successful with FP.	97	0.97 (0.17)
Fall prevention is an important aspect of my job.	98	0.98 (0.14)
Falls increase an elderly person's death rate.	85	0.85 (0.36)
Elderly hip fractures occur by falls.	97	0.97 (0.17)
Sliding is not falling.	55	0.55 (0.50)
The more medicine you take, the higher your fall risk.	76	0.76 (0.43)
Depression is not related to falls.	58	0.58 (0.50)
The more diseases you have, the higher your fall risk.	90	0.90 (0.30)
Someone with a visual impairment has a higher risk for falls.	100	1.00 (0.00)
Being numb in the limbs is not related to falls.	47	0.47 (0.50)

Nurses' Attitudes toward Fall Prevention

Overall, nurses' attitudes were found to be positive (M=86.86+ SD =9.54). Table 4 shows nurses' attitudes toward fall prevention based on each attitude item. Most nurses in this study were concerned about patient falls (84%), and the majority knew that they were responsible for patient falls (81%). 69% of them agreed that fall prevention currently occurs through updates, education, and learning. However, 46% of nurses disagreed that patient falls are inevitable, but the majority agreed that they need to assess all patients to identify elements of risk for falls during admission and each move (98%). Most nurses (79%) agreed that when someone asks for help moving, they assist immediately. In addition, 70% of nurses believe that preventing falls should be a major concern, and 60% of them are familiar with stabilization assessment and patient tasks.

Nurses' Practice in Fall Prevention

The current study indicates the good practice of nurses in fall prevention (M=92.03+ SD =9.96). Table 5 shows the nurses' practice in fall prevention based on the practice items. The practice of color coding is extremely high (99%), and 98% strictly adhere to fall prevention guidelines. In addition, nurses highly agreed that they ensure adequate hydration and nutrition (96%), and they discussed fall prevention options (97%). 94% of caregivers recommend appropriate footwear, seek occupational therapy to assess and guide ADLs/IADLs (94%), and evaluate the patient for social support and funding for assistive devices such as eyeglasses and hearing aids (95%). Although nurses in the study were involved in developing fall prevention plans, they also agreed that these plans needed specific improvements.

Table 4: Mean, Standard Deviation, Percentage of Attitude Items in Fall Prevention

Attitude Items	Percentage (%)					
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean (SD)
I am concerned about patient falls.	84	15	1	-	-	4.83 (0.40)
I think falls among patients is unavoidable.	16	24	13	30	17	2.92 (1.37)
I think nurses are responsible for patients' falls.	46	35	14	4	1	4.21 (0.907)
I have concern about interventions for FP.	58	32	9	1	-	4.47 (0.707)
FP is higher priority for intervention.	66	26	7	1	-	4.57 (0.677)
Updates and education in the current trend of the FP is important in the FP programme.	69	27	4	-	-	4.65 (0.56)

I have to assess all the patient on to determine risk factors for falls during admission and every shift.	78	20	2	-	-	4.76 (0.47)
A patients' fall risk level should be inspected when hospitalised.	73	25	2	-	-	4.71 (0.50)
Falls preventive education is necessary.	72	20	6	2	-	4.62 (0.69)
FP interventions should be done actively.	73	22	5	-	-	4.68 (0.57)
I will help immediately if someone asks for help when they move.	78	20	2	-	-	4.76 (0.47)
The hospital environment is not safe for FP.	32	28	21	17	2	3.71 (1.15)
Physical injury is not severe even if a fall happens.	49	13	13	19	6	3.80 (1.38)
If injury occurs falling has little significance.	51	20	15	12	2	4.06 (1.15)
Fear of falling has a negative impact.	48	23	14	13	2	4.02 (1.16)
I feel guilty if my patient fall.	65	27	7	-	1	4.55 (0.72)
I have confidence in ability to prevent fall.	55	33	10	1	1	4.40 (0.79)
I need more training in fall prevention.	41	40	11	2	6	4.08 (1.07)
Fall prevention should be high priority.	70	26	3	1	-	4.65 (0.59)
I am familiar with the assessment of a patient's balance and activity.	60	31	6	2	1	4.47 (0.78)
			Total Mean Score			86.86 (9.54)

Table 5: Mean, Standard Deviation, Percentage of Practice Items in Fall Prevention

Characteristics (Practice Items)	**Percentage (%)**					
	Strongly Agree	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**	**Mean (SD)**
Follow the colour coding system for high risk for fall patients?	77	22	1	-	-	4.76 (0.45)
Follow the FP policies strictly?	69	29	2	-	-	4.67 (0.51)
Participate in making FP policies?	59	28	12	-	1	4.44 (0.78)
Experience any fall in your unit?	60	21	10	6	3	4.29 (1.07)
Offer/assist patient to go toilet?	73	22	4	1	-	4.67 (0.60)
Encourage adequate hydration and nutrition?	67	29	4	-	-	4.63 (0.56)
Provide educational tools regarding FP to your patient?	66	28	5	1	-	4.59 (0.64)
When a patient fall is witnessed by staff and has no obvious injuries, how often is this reported?	64	26	9	1	-	4.53 (0.70)
When a patient reports a fall, but is not witnessed by staff, how often is this reported?	63	25	11	1	-	4.50 (0.73)

Discuss ways to prevent falls.	75	22	3	-	-	4.72 (0.51)
Request physiotherapy to evaluate/treat strengthening, gait training, etc.	71	24	5	-	-	4.66 (0.57)
Encourage adequate footwear.	70	24	6	-	-	4.64 (0.60)
Seek for occupational therapy to evaluation and instruction for management of ADL/IADLs.	73	21	6	-	-	4.67 (0.59)
Evaluate your patient for social support and resources such as glasses/hearing aids funding.	71	24	5	-	-	4.66 (0.57)
		Total Mean Score				92.03 (9.96)

The Relationship between Nurses' Knowledge, Attitudes, and Practice of Fall Prevention

Spearman's rho correlation analysis showed that there was a moderate, positive, and significant relationship between nurses' knowledge and their attitude toward fall prevention (r=0.57, p< 0.05) (Table 6). Meanwhile, a strong, positive, and significant relationship was found between attitude and practice (r=0.76, p<0.05). There was a moderate, positive, and significant relationship between nurses' knowledge and practice regarding fall prevention (r=0.50, p< 0.05).

Table 6: The Relationship between Knowledge, Attitude, and Practice on Fall Prevention among Nurses

Variables	**Correlation Co-efficient, *r***	***p*-value**
Knowledge and Attitude	0.57	0.00*
Knowledge and Practice	0.50	0.00*
Attitude and Practice	0.76	0.00*

**Note: p<0.05.*

The Difference between Sociodemographic Data with The Knowledge, Attitude, and Practice on Patients' Fall Prevention Among Nurses

In the current study, the difference in knowledge, attitude, and practice on fall prevention among the selected demographic variables was examined using the Kruskal-Wallis test (Table 7). Our results show that there is no significant difference in knowledge, attitude, or practice between nurses' ages and their highest level of education. However, knowledge and attitude differ significantly with nurses' work experience (p<0.05). In contrast, there was no significant difference in the practice of fall prevention between the nurses and their work experience.

Table 7: Comparing the Nurses' Knowledge, Attitude, and Practices with their Age, Working Experience and Highest Level of Nursing Education

Variables		***df***	***p*-value**
Age	Knowledge	2.07 (3)	0.56
	Attitude	2.31 (3)	0.51
	Practice	0.50 (3)	0.92
Working experience	Knowledge	10.83 (4)	0.03*
	Attitude	9.54 (4)	0.05*
	Practice	5.96 (4)	0.20
Highest level of nursing education	Knowledge	2.60 (3)	0.46
	Attitude	3.97 (3)	0.27
	Practice	2.74 (3)	0.43

** Note: p<0.05.*

DISCUSSION

Falls are common among hospitalized patients, with negative consequences for both patients and hospitals. Despite the advancement of medical technology, it is still important to address patients' safety needs and prevent falls. Mobile health technology presents a creative solution for offering customized fall risk assessment,

forecasting, and engagement. The primary objective of this study was to determine the knowledge, attitude, and practice of fall prevention among nurses (Hsieh, Chen, & Sosnoff, 2023). The results of the study on this topic are comparable to previous work on similar populations.

Female nurses make up the largest proportion of respondents in our study, as previous research found that the nursing profession is currently still predominantly female-dominated (Budu *et al*., 2019). Half of the nurses in this study were under 30 years old, and most of them had been working as nurses for 3 to 5 years. In addition, most of the nurses in this study had a diploma in nursing, as this was required for employment in Malaysian hospitals. The study found that the clinical work areas with the highest number of respondents were the medical departments, as medical departments care for the most acute inpatients, which require more staff compared to other departments.

A fall prevention service, consisting of a fall risk screening and assessment including a medication review, was implemented, resulted in a substantial number of medication adaptations and lifestyle recommendations, but many barriers were identified that hamper the sustained implementation of the service (Gemmeke *et al*., 2023). The results of the study showed that knowledge of fall prevention was significantly high among nurses. This could be due to their awareness of patient falls and their potential impact on the hospital. In addition, the hospital provided training opportunities to ensure consistent patient safety education. This finding is consistent with studies in Saudi Arabia, China, and the United States (Ganabathi, Mariappan & Mustafa, 2017; Wang *et al.*, 2022). However, a previous study by Lim and Yam (2016) found a moderate level of knowledge among nurses. In addition, the nurses in our study agreed that the recidivism rate was high among individuals who had already experienced a fall. According to Curran-Gromme *et al.* (2020), a significant and particularly high-risk subgroup of patients who experience two or more falls within a year are more likely to be severely injured and have high risk factors for falling again compared with patients who experience only one fall. On the other hand, most nurses indicated that the modified Morse fall risk assessment tool is useful in identifying high-risk patients and preventing falls. Most of them are familiar with this instrument, as it is commonly used and widely accepted. Previous research has found that of the large number of patients who were assessed as being at risk for falls using the modified Morse scale, very few of them experienced a fall during their hospital stay (Gringauz *et al.*, 2017). Nurses in private hospitals had lower knowledge scores but higher scores in applying fall prevention measures compared to those in other hospitals. Additionally, there was a positive correlation between knowledge and application in governmental hospitals but a negative correlation in private hospitals (Hussein, & Mohamed, 2018).

The nurses in the current study had a positive attitude toward fall prevention. They were concerned about patient falls and agreed that they were responsible for fall prevention in the clinical setting. Ganabathi, Mariappan & Mustafa (2017) and Cho and Jang (2020) also showed positive attitudes toward fall prevention among nurses. Of the 100 nurses in this study, 46 disagreed that falls in patients are unavoidable because fall prevention is a higher priority for intervention. Most of them agreed with assessing all patients to identify risk factors for falls on admission and continuously monitoring them throughout their hospital stay. They were aware of patients' falls, especially those at high risk of falling. Indeed, they found that fall prevention activities were significantly higher in patients who had already fallen than in patients who had not (Han, Kim & Hong, 2020). In addition, nearly half of the nurses in this study agreed that updates and education on the current trend of falls and fall prevention programs are important to prevent patients from falling. In many fall prevention strategies, education was used as a stand-alone measure or as part of a multifactorial measure (Shaw, Kiegaldie & Farlie, 2020). In addition, most nurses agreed that the hospital environment is not safe for patients because it can lead to falls, and only a minority disagreed with this statement. Falls that occur to patients during their hospital stay pose a significant safety risk and are a major standard of care issue in many hospitals and healthcare facilities around the world. Patient falls during hospitalization comprise the organization's level of environmental safety as they demonstrate a lack of safety and security and often result in an increase in patient hospitalization days as well as a worsening of their recovery (Stathopoulos, Ekvall Hansoon & Stigmar, 2021).

It was found that nurses' fall prevention practices were at a high level, as evidenced by the practice item ratings. In contrast, nurses' practice was rated low in a study by Suryani *et al.* (2020), but they believed that knowledge-based practice was more sustainable than knowledge itself. Nurses practicing 24 hours a day are believed to have a strong influence on the patient care process as well as assessment practice (James *et al.*, 2020). The results of the study showed that the nurses in both hospitals were aware of the fall prevention measures and

were involved in their development. In addition, almost all of them agreed to follow the color-coding system for patients at high risk for falls. It is noted that color coding in each ward is important to prevent patients from falling, especially high-risk patients such as elderly patients, patients with lower limb problems, or patients with neurological deficits caused by treatments, medications, or other related factors. Ganabathi, Mariappan & Mustafa (2017) confirmed that the color-coding system is helpful in reducing the risk of falls in patients. On the other hand, the study found that most nurses have good practice awareness as they offer or assist patients to go to the toilet and encourage them to have adequate hydration and nutrition, in addition to discussing with them how to prevent falls. A healthy diet helps reduce the risk of falls by supporting healthy muscle and bone strength (International Osteoporosis Foundation, 2019). They were concerned about patient falls and felt guilty when a patient fell.

In this study, substantial relationships were found between nurses' knowledge, attitudes, and practices regarding fall prevention. The null hypothesis is therefore disproved. The connection between nurses' knowledge and attitude towards fall prevention was moderately positive and significant. This is in line with research of a similar nature (Chong *et al.*, 2019; Han, Kim & Hong, 2020), which also discovered a substantial positive connection between these variables. A strong correlation between knowledge and attitude suggests that nurses with a favorable attitude toward patients' fall prevention are more likely to have a high level of knowledge about fall prevention. To increase nurses' knowledge of fall prevention and transform their attitudes toward patients' fall prevention, fall prevention education should be conducted often. However, Cho and Jang (2020) found no connection between nurses' attitudes and knowledge of fall prevention. It's interesting to note that this study also found a significant, favorable, and robust association between fall prevention practice and attitude. The findings are consistent with other earlier research (Suryani *et al.*, 2020; Cho & Jang, 2020; Han, Kim & Hong, 2020) that found a statistically significant favorable association between attitude and practice in fall prevention. This research indicated that the more fall prevention practices were present, the greater the attitude toward falling. The relevance of attitude toward falling is demonstrated by Han, Kim & Hong (2020), who claimed that changing nurses' attitudes is more essential than enhancing knowledge and ability in preventing falls. The relevance of attitude toward falling is demonstrated by Han, Kim & Hong (2020), who claimed that changing nurses' attitudes is more essential than enhancing knowledge and ability in preventing falls. These results suggest that the most significant factor impacting fall prevention attempts is one's attitude toward falling. As a result, it is essential to constantly foster a fall prevention knowledge and participation attitude to improve fall prevention activities in long-term care facilities. On the other hand, among the nurses in this study, there was a fair, significant, and favorable association between knowledge and practice about fall prevention. This is comparable to a 2020 Indonesian study by Suryani *et al*. that found a substantial correlation between nurses' knowledge and practice in reducing fall risk. In contrast, there was no statistical correlation between nurses' fall prevention practices and patients who were hospitalized (Sinuraya, 2016). Han, Kim & Hong (2020) discovered that awareness of falls did not significantly influence fall prevention practices that might be related to ignorance.

According to this study, there are considerable knowledge and attitude gaps among nurses, depending on their level of experience. In contrast, Han, Kim & Hong (2020) found that people with more than 20 years of experience and a higher age than 40 had significantly more understanding of fall prevention than those with less experience. The study also discovered that the understanding of fall prevention among long-term care hospital nurses varied significantly according to age, clinical experience, and educational level. The expertise of the nurses and their work experience were also discovered by Ganabathi, Mariappan & Mustafa (2017) to be statistically significant. Similarly, Cho and Jang (2020) showed that nurses' understanding of falls improved after witnessing patients fall.

The degree of education of nurses and their age group were also mentioned by Suryani *et al.* (2020) as contributing variables to high knowledge. However, in line with this study's findings, a study by James *et al.* (2020) that examined the years of nursing experience revealed both a substantial link and a positive relationship with the amount of knowledge that corroborated the findings. Additionally, nurses' fall prevention practices were favorably correlated with better educational attainment, more experience, past patient fall experience, and knowledge of fall prevention (Negash, 2022). This shows that as nurses work more hours, their knowledge of fall prevention increases as a result of the increased information and practical experience they have. Age and the highest level of education had no bearing on knowledge, attitude, or fall prevention practice scores. It may have been difficult for nurses to regularly execute fall-related care practices due to a lack of staff or an excessive workload. To ensure that nurses actively participate in fall prevention practices, the ward manager must take the

initiative by offering the appropriate incentives and rewards. To significantly enhance nurse practices in fall prevention, educational initiatives emphasizing fall prevention within the academic curriculum should be established, as should ongoing educational programs.

CONCLUSION

In conclusion, the present study assessed the current knowledge, attitudes, and practices of nurses in teaching hospitals regarding fall prevention in patients and determined the relationship between the variables. It was found that nurses were well informed about the risk of falls, the use of fall assessment tools, and the factors contributing to falls. Nurses' positive attitudes toward falls were also found, as they admitted that they felt guilty about fall-related cases and expressed that they were not fully trained to deal with falls in hospitals. Apart from this, nurses agreed that appropriate nursing practice in the clinical setting should prevent falls.

This finding has positive implications for nurses and healthcare organizations working with diverse client teams. It provides evidence that multiple intrinsic and external factors contribute to falls. Registered nurses are believed to play a critical role in fall prevention by assessing the risk of falls at the patient's bedside and providing treatment 24 hours a day. In addition, patient safety in medical facilities can be improved by creating an environment in which fall prevention is voluntary and self-directed, and by providing appropriate encouragement and benefits. Intrinsic elements include improving production in nursing practice to stabilize fall prevention with various other tasks and updating registered nurses' skills in fall prevention methods. Training programs aimed at addressing organizational weaknesses and promoting strengths could help reduce the rate of falls. Further research is also needed to identify factors that impact nurses' knowledge, attitudes, and practices related to patient fall prevention through a qualitative study. It is also recommended that the study be expanded to more than two hospitals across the country to determine nurses' knowledge, attitudes, and practices related to fall prevention. This would improve the quality of care among nurses in Malaysia, especially regarding fall prevention, because the larger the sample, the more accurate the results.

Conflict of Interest

The authors have no competing interests in this study.

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