Original Research Article

The Associated Factors with the Occurrence of Patients Falling in a Government Hospital in Saudi Arabia: A Cross-Sectional Study of Nurses

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Abstract

Introduction: Patient falls are a global concern that has been identified as one of the most common adverse events affecting patient safety in healthcare institutions around the world. In this study, factors associated with the occurrence of patients falling were investigated and classified into three categories: patient-related factors, environment conditions and nurse-related factors. ***Methods:*** The study was descriptive and cross-sectional. It was conducted between 15 February and 15 March 2024 in King Saud Medical City. A self-administered questionnaire was personally sent to staff nurses. The total nurses participating in the study was 504. ***Results:*** The most common factors leading to patient falls are wet floors, an absence of warning signs, a lack of safety grab bars, unsafe corridors, and a shortage of staff nurses, as well as distributing patients in different rooms, making it difficult to observe all of them simultaneously. Moreover, a patient who starts walking after an extended period in bed will be at increased risk of falling. Nurses also agreed that polypharmacy can be a risk factor for patient falls. ***Conclusion:*** The results present a clear picture of the various factors that healthcare professionals perceive as contributing to patient falls. Environmental conditions, operational issues and patient-related factors all play significant roles.
Keywords: Patient Safety, Quality of care, Patient Fall, Falling, Safety.

INTRODUCTION

A *patient fall* is defined by the Ministry of Health (MOH) in Saudi Arabia as ''an unplanned descent to the floor with or without injury to the patient. A fall may result in fractures, lacerations, or internal bleeding, leading to increased health care utilization'' [2]. Falls have been classified as the second-leading cause of unintentional deaths around the world, with approximately 684,000 people dying from falls every year. Adults older than 60 years are the most likely to experience a fatal fall [3].

In the United Kingdom, more than 250,000 people over the age of 65 are at risk of falling that could lead to death [4]. In fact, within healthcare settings, approximately 2–3% of falls lead to serious harm, such as fracture, spinal cord injury, head trauma, or death [5-7].

In their study, Schaffer, Daraiseh [8] found that there were 53 falls reported over a six-month period; 31 of the falls led to injury, and 17% needed treatment. Additionally, Innab [9] found that the intrinsic factors of patient falls were patients' having impaired balance, limited mobility, impaired muscle strength, and an inability to follow safety instructions. Furthermore, nurses observed that vertigo, dizziness, cognitive impairment, visual impairment or being 85 years or older were contributing factors. The extrinsic factors were slippery and wet floor surfaces.

Alrimali, Alshammari [10] in their study of 16 government hospitals in Saudi Arabia, found significant differences in the knowledge scores among hospitals, whilst attitude and practice scores were statistically significant for multiple factors, including gender, place of work, experience of falling accidents and fall-

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prevention training (frequency, duration, source).

Kelsey, Procter-Gray [11] in their prospective cohort study to identify risk factors and mechanisms of falls among 765 men and women mainly aged 70 years and older, found that, at the time of in-home falls, 51.9% of people were barefoot, wearing socks without shoes or wearing slippers. In fact, 10.1% of people reported that their usual footwear was one of these types. The use of such footwear does not create great traction with the ground, leading to a slippery experience walking. This supports the previously mentioned extrinsic factors of slippery and wet floor services that contribute to patient falls. In addition, the adjusted odds ratio of 2.27 suggests that individuals who were either barefoot or wearing slippers at the time of their falls had approximately 2.27 times the odds of sustaining a serious injury compared to those wearing other types of shoes. This finding implies that footwear might play a role in preventing serious injuries during falls at home.

Razik, Alslimah [12] in their cross-sectional study at two tertiary hospitals in Saudi Arabia to determine the nature and severity of fall injuries at a tertiary hospital, concluded that fall injuries in this setting were severe, and caused severe head, chest, skull, brain, scalp, rib, abdominal, pelvic and lower-limb injuries.

MATERIALS AND METHODS

The aim of this study was to investigate the factors associated with the occurrence of patients falling and their injuries in a governmental hospital in Saudi Arabia. The main objective was collecting and analysing data by surveying nurses and use that data to establish which factors contribute to patient falls as well as how to minimise their occurrences.

The study is descriptive and cross-sectional. It was conducted between 15 February and 15 March 2024 in King Saud Medical City. This study is descriptive, as the scope and objective were to evaluate nurses' perception of patient falls and injuries. Additionally, it explores the contributing factors of the falls.

The survey method of data collection was employed. In quantitative studies, various methods can be used to collect data singularly or in combination, depending on the required data [13]. According to [14] , the choice of research method depends on the nature of the research problem and the phenomena being explored. In quantitative studies, however, different types of measuring instruments or tools can be used to measure the study variable(s), such as observation, interview and questionnaires [13]. In this proposed study, a self-administered questionnaire method was validated by a nursing expert and used in this study. The questionnaire included demographic attributes, and the viewpoint of nurses around the factors associated with patient falls in three categories: patient-related, environment conditions and nursing-related factors. The questionnaire was written in both Arabic and English at a level of language that was understandable by all the participants, grammatically correct and free of value-laden terms and jargon [13].

Finally, the questionnaires were distributed to the participants online using Survey Monkey, ensuring participant anonymity and confidentiality.

Convenience sampling was used in this descriptive cross-sectional study. Researchers prefer convenience sampling because it is an appropriate way for researchers to obtain participants [13]. Nursing staff were recruited from King Saud Medical City in Riyadh.

To be included in the study, the nurses had to currently work in King Saud Medical City, be a registered nurse with the Saudi Commission of Health Specialties, provide direct nursing care to patients and be willing to participate in this study. Nurses who were not listed as "registered nurses" with the Saudi Commission for Health Specialties were excluded from the study. The link was sent to 1,011 staff nurses in King Saud Medical City, of whom 532 were willing to participate voluntarily in the study. The voluntarily total completed surveys were 504, a return rate of 49.9%.

The study was piloted with seven nurses at the General Hospital of King Saud Medical City. Piloting the study with a small number of candidates provided valuable insights and increased the likelihood of success whilst avoiding costs and time being wasted on an inappropriate or an inadequate research project [15].

Descriptive and inferential statistical procedures were used in this study to describe, organise and summarise the raw data. Data were analysed using Statistical Package for Social Sciences (Version 24, IBM Corporation, Armonk, NY, USA).

The study was reviewed and approved by the Institutional Regional board (IRB) research ethics committee of King Saud Medical City in Saudi Arabia (Approval number H1RI-08-Feb24-03.). It was explained to the potential participants that the study was confidential and to be used for scientific research purposes only. It was made clear that the researchers would not be able to identify, nor would they require the identification of, any of the respondents by name in any reports using the information obtained from the evaluation paper. Additionally, the respondents were given the opportunity to refuse to participate and were able to withdraw at any stage of the research without any penalty. Participants were provided with a description of the study, including the study's purpose, consent statements and the estimated time required to complete the questionnaire. Participants were assured that their willingness to participate was voluntary.

RESULTS

The majority of respondents (Table 1), 79.88%, hold a Bachelor of Science in Nursing (BSN). This underscores the common entry-level qualification for nursing practice and indicates a strong foundational education among the surveyed nurses. There are significantly fewer respondents with advanced degrees such as a Master's in Nursing (MSN), a postgraduate diploma, or a PhD/Doctor of Nursing. This suggests that while many nurses have attained a BSN, fewer have pursued further education or specialization beyond the undergraduate level.

Also in Table 1, the largest group of nurses falls within the 10-13 years of experience category, closely followed by those with more than 13 years of experience. This indicates that a significant portion of the nursing workforce has accumulated a moderate to extensive amount of experience. The smallest groups are those with 3-5 years and 0-2 years of experience. This suggests that there are fewer nurses in the early stages of their careers, possibly due to attrition rates, entry requirements, or other factors influencing the nursing profession. The data reflect good engagement from survey participants, as evidenced by the distribution across various experience categories without significant gaps or missing responses. This enhances the reliability and representativeness of the findings.

The majority of nurses (Table 2) work 8-hour shifts. This is a standard shift length in many healthcare settings and reflects a common practice for managing nursing schedules. A significant number of nurses work 12-hour shifts. This shift length is popular among nurses as it allows for longer periods off between shifts, potentially improving work-life balance and reducing commute frequency. A smaller portion of nurses work more than 12 hours per day. Extended shifts can lead to increased fatigue and reduced alertness, which may affect patient care quality and increase the risk of fall. Understanding the distribution of shift lengths among nurses is crucial for developing effective staffing policies. It helps in determining appropriate nurse-patient ratios and ensuring adequate coverage across all shifts, especially during peak periods or when patient care demands fluctuate.

The majority of nurses (table 3) in the study are responsible for caring for 4-6 patients per day. This patient-to-nurse ratio is common in many healthcare settings and represents a standard workload for a significant portion of nurses. A significant minority of nurses have assignments of 1-3 patients per day. This could indicate that these nurses work in settings such as intensive care units (ICUs), where patients require more intensive monitoring and care, or with patients who have complex medical needs that demand more individualized attention. A smaller percentage of nurses were caring for 7 or more patients per day. Notably, 10.12% of nurses are responsible for more than 12 patients daily. This higher workload may pose challenges in delivering optimal care, as it can stretch nurses' capacity to provide adequate attention and monitoring to each patient.

Table 1 shows that 65.28% of the nurses surveyed had attended training, seminars or conferences related to the risk of patient fall or patient safety in the last year, which suggests a good professional commitment to staying informed on this critical aspect of patient care.

As shown in Table 1, 36.71% of nurses have reported a patient fall at some point in their career indicates several things about the occurrence and reporting of falls in healthcare settings. This percentage suggests that a significant proportion of nurses have encountered at least one instance of patient falls during their careers. This aligns with the understanding that falls are not uncommon in healthcare environments. Furthermore, this percentage also implies that reporting practices and systems for documenting patient falls are in place within healthcare facilities. Accurate reporting is essential for tracking trends, identifying risk factors, and implementing targeted interventions to improve patient safety and prevent future falls.

Vast majority of nurses (89.78%) have encountered between 1 to 5 patient falls during their careers. This percentage implies that for most nurses, patient falls are infrequent occurrences. However, it also raises the possibility that there could be underreporting or instances where falls go unnoticed, as only a small percentage of nurses have been aware of a higher number of falls (Table 4).

Demographic Characteristics Included in the Questionnaire:

Table 1: Biographical Data

Gender		
Female	449	89.08%
Male	55	10.91%
Age		
18–24	34	6.74%
25–34	254	50.40%
35–44	160	31.75%
45–54	48	9.52%

55–64	8	1.59%
Qualifications		
Diploma	73	14.48%
Bachelor (BSN)	403	79.96%
Masters (MSN)	18	3.57%
Postgraduate Diploma after BSN	8	1.59%
PhD/Doctor of Nursing	2	0.40%
Attendance of Training/Seminars on Patient Falls or Safety		
Yes	329	65.28%
No	175	34.72%
Years of Experience		
0–2 years	79	15.67%
3–5 years	75	14.88%
6–9 years	100	19.84%
10–13 years	137	27.18%
More than 13 years	113	22.42%
Reporting Patient Falls		
Yes	185	36.71%
No	319	63.29%

Table 2: How many hours does the participant work per day?

Daily Working Hours	Responses	Percentage
8 hours	313	62.10%
12 hours	147	29.17%
More than 12 hours	44	8.73%

Table 3: For how many patients does the participant directly provide care in a day?

Number of Patients	Responses	Percentage
1–3 patients	99	19.64%
4–6 patients	312	61.90%
7–9 patients	24	4.76%
10–12 patients	18	3.57%
More than 12 patients	51	10.12%

Table 4: Awareness of Patient Falls During Their Careers

Number of Falls	Responses	Percentage
1–5	451	89.48%
6–10	36	7.14%
11–15	6	1.19%
16–20	4	0.97%
21 and above	7	1.39%

DISCUSSION

The Cronbach's Alpha value for the survey is 0.811, which suggests a good level of internal consistency among the 29 items included in the survey. This indicates that the items tend to measure the same underlying concept: in this case, the causes of patient fall in a hospital setting as perceived by nurses.

Most nurses (72.11%) believed that wet floors increased the risk of patient falls. This supports the viewpoint of Innab [9] whose cross-sectional, correlational, descriptive study that found patient falls were associated with wet floor surfaces.

More than 70% of the nurses agreed (71.83%) that the absence of warning signs on wet floors could lead to patient falls, emphasising the importance of such preventive measures. Similarly, the Women's College Hospital in Toronto emphasised in their Fall Prevention Guideline the necessity of 'wet floor' signs in preventing falls [16].

A clear majority of nurses (77.58%) believed that a lack of safety grab bars in patient areas increases the risk of falls, highlighting the perceived importance of these safety features. Tzeng and Yin [17] focused on the safety concerns related to grab bars and handrails in acute care settings. They concluded that grab bars and handrails might be an effective way to enhance the safe

ambulation of patients with or without assistance in all the areas used by patients. The installation of fixed grab bars and handrails in areas commonly used by patients, such as patient rooms, bathrooms and hallways, can be an effective and economical measure to prevent inpatient falls. These safety features provide support and stability, especially for individuals with mobility limitations or those at risk of falls [17].

Most respondents (72.37%) agreed that unsafe corridors, possibly cluttered with medical equipment, contribute to the risk of patient falls. Regular assessment of corridors for fall risks and making necessary modifications is an essential component of fall prevention.

Approximately two thirds (60.36%) of nurses agreed that staff shortages could lead to patient falls, indicating that adequate staffing is seen as a critical component of patient safety. The effectiveness of increasing the number of registered nurses (RNs) can vary depending on several factors, including the type of unit and the existing level of staffing [18]

More than half (59.44%) of respondents agreed that patient falls occur when the nursing staff do not perform regular rounds of patients with moderate to high fall risk. Goldsack, Bergey [19] found in their 30-day prospective pilot study that a patient-centred proactive hourly rounding strategy significantly reduced patient fall rates; Anu [20] also found that an hourly round is effective in reducing patient falls.

The data strongly suggest that respondents believed patient falls occur when nursing staff are occupied with other duties, with a combined 75.15% agreeing or strongly agreeing with the statement. Grant, McEnerney [21] agreed that nursing staff were busy with routine duties, resulting in having insufficient time to sit with patients constantly, leading to serious patient fall injuries. Most patient falls occurred while staff were not present or were busy with other patients [22] Hirsbrunner, Denhaerynck [23] found a correlation between nurse staffing variables to inpatient falls and injuries and a partial link between both of them. Still, this suggests that further investigation is needed to fully understand the complex factors influencing this association, particularly at the unit level in terms of safety climate.

Most respondents (73.16%) agreed that patient falls were more likely to occur when patients were distributed in different rooms, making it difficult to observe all of them simultaneously. This suggests a strong consensus that patient distribution and visibility are factors in fall risk. In line with this, Brewer, Carley [24] performed an exploratory longitudinal correlational study to measure the communication structures in a nursing unit over a seven-month period. They found that nursing unit design shape and size affect patient falls.

They recommended that the design be considered when planning the hospital construction of nursing care units. Furthermore, research has revealed that patients in beds that are not visible from the corridor are most likely to fall than those in beds that are visible [25-27].

Over half of the participants (57.45%) agreed or strongly agreed that patient falls can occur when a patient walks without proper footwear or in light shoes, such as slippers. Studies reveal that going barefoot or wearing slippers is associated with increased risks for falls [11]. This suggests that appropriate footwear may play a role in preventing patient falls.

Over half of the participants (54.47%) believed that walking in socks without shoes can lead to falls, indicating that non-slip footwear might be important for patient safety. It was reported that there is an association between walking in socks without shoes or in slippers that have no soles might increase the risk of falls, especially in older patients [28]. In addition, factors like reduced muscle strength, balance deficits and changes in gait associated with aging can further contribute to the risk of falls when walking in socks or inadequate slippers. Therefore, it is important to encourage the use of supportive footwear with proper grip and traction, particularly in environments where slip and fall hazards are present.

The presence of an observer or attendant with the patient was deemed important by the 70.52% of respondents who agreed or strongly agreed that the absence of an observer increases the risk of patient falls. Patient attendants might help nurses, and they play an important role in observing patients at risk of falling in patient rooms [29]. Conversely, Greeley, Tanner [30] in their systematic review of 18 studies to determine the effectiveness of sitters and alternatives to sitters in preventing patient falls, concluded that the evidence was weak that having a sitter present helped reduce falls. Feil and Wallace [31] recommended encouraging hospitals to implement a patient sitters' program. They found it to be successful in reducing falls and controlling costs in other organisations.

Most (75.50%) respondents agreed or strongly agreed that agitation in bed can lead to patient falls, highlighting the importance of monitoring and managing patient agitation. By recording the occurrence of falls alongside manifestations of agitation across different shifts, healthcare professionals can identify potential correlations or patterns between these variables. For example, an increase in agitation levels during certain shifts may coincide with a higher frequency of falls, suggesting a need for additional staffing support or targeted interventions during those times. Additionally, understanding the interplay between falls and agitation dimensions can inform holistic approaches to resident care, encompassing both physical safety and emotional well-being [32-34].

Among the survey participants, 71.46% recognised the risk of falling when a patient starts walking after an extended period in bed, suggesting the need for gradual mobilisation protocols. While bed rest may be necessary for certain medical conditions or during recovery from injury or surgery, prolonged bed rest can have negative consequences for overall health and well-being. It is important to balance rest with appropriate levels of physical activity to maintain cardiovascular health, muscle strength, bone density and overall metabolic function [35].

A large proportion of respondents (71.16%), either agreed or strongly agreed that polypharmacy could be a risk factor for patient falls. This indicates a potential need for medication management to reduce the risk of falls in patients taking multiple medications. Many medications are associated with a risk of falls, especially in older patients. Zhou, Jia [36] performed a study into pharmacovigilance in which they analysed 34,840 fall events and 1,898 drugs to detect the risk signals of drug-induced falls. Their study revealed that antipsychotics, antidepressants, antiparkinsonian drugs, central nervous system drugs, anticonvulsants and hypnotic sedatives [37] were more likely to be associated with drug-induced falls. In fact, fall studies have found that taking four or more drugs at a time greatly increases fall incidents, recurrent falls and serious injuries [38].

CONCLUSION

To reduce the incidence of falls, it is imperative to implement multifaceted interventions that address these factors. Ensuring proper environmental safety, optimising staffing and workloads and focusing on individual patient needs and behaviours are key strategies that should be pursued. Moreover, continuous education and training for staff on fall prevention, along with regular reassessment of the hospital environment and operational policies, are recommended to maintain a safe healthcare environment for patients.

Hospitals use technology like bed alarms or monitoring systems to help alert staff when a patient is attempting to get out of bed unsafely. Additionally, ensuring adequate staffing levels and providing ongoing staff training in fall-prevention techniques can also make a significant difference. Furthermore, hourly regular rounds by nurses are critical for patient safety, especially for those at moderate to high risk of adverse events like falls.

Limitations of Study
The study was conducted in one setting, with the nurses of General Hospital of King Saud Medical City. Five other hospitals make up the medical city. The study should be extended to the other hospitals of King Saud Medical City.

Conflicts of Interest: The authors declare no conflicts of interest.

RECOMMENDATIONS

Further studies should be conducted to evaluate the effectiveness of the electronic systems to prevent patient falls: i.e., bed alarms or monitoring systems. Technologies like bed alarms and monitoring systems might provide an extra layer of protection that can alert staff to potential risks and fall events.

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