



The effect of nurses' training on the implementation of preventive measures for falls in hospitalized elderly patients

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Abstract

Objectives: This study aimed to assess the impact of nurses' training on the implementation of preventive measures for falls in hospitalized elderly individuals.

Methods: A quasi-experimental study was conducted, involving 64 nurses employed at Ganjavian Hospital in Dezfoul, Iran. Convenience sampling was used to select the participants between April 15th and July 15th, 2020. The nurses were then randomly assigned to either the intervention or control group. Initially, a checklist was utilized to assess both groups' fall prevention activities for older patients. Subsequently, the intervention group received workshop training, while no specific intervention was provided to the control group. After a two-week period, the fall prevention behaviors were reassessed in both groups. Data analysis was performed using SPSS software version 16, employing independent t-tests, paired t-tests, chi-square tests, and analysis of covariance.

Results: Prior to training, the mean score for nurses' fall prevention behaviors was 12.31 ± 4.12 . Following the training, the mean score significantly increased to 26.78 ± 3.41 ($p < 0.001$). Furthermore, after controlling for underlying characteristics such as ward and job experience, as well as baseline values, significant changes in mean scores between the control and intervention groups were identified ($p < 0.001$).

Conclusion: Workshop training sessions tailored to nurses' needs can effectively enhance their implementation of fall prevention behaviors for elderly patients. Therefore, it is recommended to conduct similar comprehensive training interventions for nurses to mitigate falls and their associated complications among hospitalized elderly individuals.

Keywords: Falling, Preventive Behaviors, Elderly, Nurse

Introduction

In today's healthcare systems, ensuring patient safety is crucial for maintaining quality and the overall survival of the system.^[1] Health systems prioritize providing high-quality services to patients while also ensuring their safety. Among the various factors that impact patient safety in hospitals, bed falls are considered to be particularly significant.^[2] Research has shown that the risk of falling out of bed increases by up to 50% for every ten years of age

in the elderly.^[3] These falls can have severe consequences for the elderly, including loss of independence, irreversible injuries, and even death.^[4] Falls are a recurring problem in hospitals, with approximately 23–42% of falls resulting in some form of injury and 2–9% leading to serious injuries.^[5] One study reported a rate of 2.24 falls from bed per 1,000 people per day.^[6] In the United States, the rate of bed falls in hospitals was reported to be 3.56 per 1,000 hospitalized patients per day, with 26.1% of these falls resulting in

injury. Medical units had a higher rate of falls compared to surgical wards.^[7] Falls are known to be the second-leading cause of injury-related deaths among the elderly.^[8] A study conducted in Iran revealed that each nurse experiences an average of 6+1.61 patient bed falls in a three-month period.^[9] Patient falls are considered one of the five significant events for healthcare centers and can result in irreversible injuries.^[10] Serious injuries caused by falls in the elderly can include hip fractures, head injuries, prolonged hospital stays, increased hospitalization costs, and sometimes even death.^[11] In addition to the physical trauma, patients are also at a higher risk of experiencing psychological trauma such as anxiety, distress, depression, fear of falling, loss of self-confidence, increased dependence on family members, and a decreased quality of life.^[12]

There are various factors that can contribute to patients falling, including age, sex, previous falls, illness, vision and hearing problems, musculoskeletal disorders, loss of balance, drug use, and cognitive impairments. Additionally, weaknesses in the health system's maintenance and design of medical equipment, as well as human resources, can also play a role.^[13,14] It has been reported that most falls occur due to a loss of balance and falling out of bed while going to the toilet.^[3] Furthermore, other situations, such as surgery, acute illnesses, unfamiliar environments, prolonged hospital stays, and medication usage, can also lead to falls in bed.^[5,15] As public health improves and healthcare becomes more accessible, the aging population is expected to experience a rise in the incidence of falls. Therefore, it is crucial for health systems to prioritize fall prevention for the elderly.^[12]

Nurses play a crucial role in identifying patients who are at high risk of falling, as they are at the forefront of patient care. However, studies have revealed that nurses lack sufficient knowledge about patient safety, which is a cause for concern.^[16,17] Falls and the resulting injuries are considered sensitive indicators of nursing quality, as the prevention of falls is dependent on the quality and quantity of nursing care provided. It is important to note that most falls that occur in hospitals are preventable, and medical centers do not provide compensation for the damages caused by falls.^[11] Nurses maintain constant communication with patients and consistently observe their functional changes due to their round-the-clock presence. It is the responsibility of nurses to develop and implement an efficient program aimed at preventing falls and injuries.^[10] In numerous hospital environments, the nursing staff directly oversees fall prevention measures. The occurrence of patient bed falls can serve as a measure

of the effectiveness of nurses' performance.^[18] Nurses must ensure that all patients are evaluated for factors that increase the risk of falling.^[2] Enhanced knowledge and proficiency of nurses can significantly improve their ability to prevent patient bed falls.^[19,20] Conversely, several studies have highlighted the insufficient knowledge of nurses regarding fall prevention in hospitalized elderly patients, which is considered a major contributing factor to falls in this population.^[21-23] Furthermore, awareness of potential falls is closely linked to the implementation of effective fall prevention strategies.^[24] Conducting training sessions can be a valuable tool in shaping individual perspectives on modifiable factors and executing measures to prevent falls.^[24] As training interventions are a cost-effective means of raising awareness about fall prevention,^[25] it is imperative to provide classes for nurses, who have the most direct interaction with patients and play a crucial role in preventing falls in hospital settings, to enhance their proficiency in preventing bed falls.^[26]

Objectives

The present study aimed to assess the effect of training on the performance of nurses in implementing preventive measures for fall risk in elderly patients who are hospitalized. This was driven by the high frequency of falls and the unfavorable outcomes associated with them, as well as the critical role of nurses in maintaining the safety and well-being of patients under their care.

Methods

This quasi-experimental study, conducted between April 15 and July 15, 2020, took place at Ganjavian Hospital, which is affiliated with the Dezfoul Medical School in Iran.

The formula $S \approx R = 6 \cdot (33-0) / 5.5$ was used to estimate the sample size, resulting in approximately 26 cases. To account for a 20% probability of sample fall, 32 nurses were included in each group, totaling 64 nurses selected for the study based on the inclusion criteria and convenience sampling. The inclusion criteria required a willingness to participate, a bachelor's degree or higher in nursing, and at least one year of hospital work experience. Exclusions were made for those absent from training sessions with COVID-19 during the study who refused to remain in the study or held a managerial position. The 64 nurses were randomly allocated into intervention and control groups using a stratified random allocation method, with factors such as gender, age, and education level considered in the stratification. The permutation block method and a random number table provided by the statistical

consultant were used to divide the selected samples into the intervention and control groups.

Researchers designed a two-part observational checklist to collect data. The first part focused on demographic characteristics, while the second part consisted of 33 two-choice questions related to fall prevention behaviors. Each question was scored 0 for "no" and 1 for "yes," with a possible score range of 0-33. The questionnaire's validity was confirmed using the content validity method, while the internal consistency method and Kuder-Richardson 21 (KR21) were used to ensure its reliability. The KR21 coefficient was estimated at 71%. To confirm inter-rater reliability, 15 nurses were selected as participants, and three nursing experts were chosen as evaluators. The ICC coefficient for all questions ranged from 0.81 to 0.98, indicating good agreement between the three evaluators.

At the onset of the study, all participants in the control group underwent evaluation to ensure that there was no contamination. Nurses from the emergency, internal medicine, and surgery wards were chosen to evaluate the fall-prevention behaviors of their colleagues in real-life situations during the morning, evening, and night shifts without the knowledge of the staff. The existing checklist was used to observe the behaviors of each nurse in the control group during the three work shifts, and the same process was repeated two weeks later. No educational intervention was given to the control group during the evaluation period. On the other hand, the intervention group underwent the same observational evaluation process as the educational intervention, which was conducted in a workshop format in the surgical, internal, and emergency departments. Due to the COVID-19 pandemic, the workshop was limited to 8 groups with 4 participants each, and health protocols were strictly followed. A master's degree student in geriatric nursing led the 6-hour program, which included lectures, case studies, video demonstrations, and informative slides. A 30-minute question-and-answer period followed the training. Two weeks after the workshop, the evaluators observed the participants once again and recorded their findings on the designed checklist.

All assessments of fall prevention behaviors were conducted discreetly in both the control and intervention groups. The material for the training session was prepared and collated using the Patient Fall Prevention Guidelines produced by the Ministry of Health, Treatment, and Medical Education of Iran's Office of Hospital Management and Clinical Services Excellence.

The materials covered various topics related to aging, normal aging changes, factors that contribute to falls in the elderly (such as environmental factors and medications), risk factors for falls in both acute and chronic inpatient wards, general preventive interventions, and preventive measures. These topics were selected as the educational content of the program after consulting with experts.

The data analysis was carried out using the SPSS software version 16, utilizing descriptive and analytical statistical methods such as mean, standard deviation, chi-squared test, independent t-test, paired t-test, and analysis of covariance. The significance level was set at 0.05.

All participants were provided with information regarding the study's objectives and methods, and they were assured of the confidentiality and anonymity of their collected data. Participants had the right to withdraw from the study at any time. The study received approval from the Ethics Committee of the Lorestan University of Medical Sciences and was assigned the ethics code IR.LUMS.REC.1398.269.

Results

In this study, the fall prevention behavior of 64 nurses was assessed. The nurses were divided into two groups: a control group and an intervention group, with 32 participants in each group. The majority of participants were female (81.3%) and under the age of 35 (75%). Most of the participants in both groups were employed under the compulsory medical service program. The chi-squared test indicated that there were no significant differences in demographic variables between the two groups ($p > 0.05$).

The results of the paired t-test showed a significant difference in the control group's mean scores at the beginning and end of the study ($p < 0.001$). Similarly, the intervention group's mean fall prevention behavior scores showed a significant difference before and after the intervention ($p < 0.001$) [Table 1].

Furthermore, the analysis of covariance considered contextual variables such as employment and work experience, as well as baseline scores. It revealed a significant difference in the mean changes in fall prevention behavior scores between the control and intervention groups ($p < 0.001$). Although both groups showed an increase in mean scores over time, the intervention group had a significantly higher mean fall prevention behavior score compared to the control group ($p < 0.001$) [Table 2].

Table 1. Comparison of the mean fall risk prevention behavior scores in the study groups before and after the educational intervention

	Before intervention Mean±SD	After intervention Mean±SD	t*	P value
Intervention group	12.31 ± 4.12	26.78 ± 3.41	19.50	< 0.001
Control group	15.09 ± 4.12	20.31 ± 3.37	14.12	< 0.001

* Paired t- test

Table 2. Comparison of mean changes in fall prevention behavior scores before and after the intervention between the study groups

	Before intervention Mean±SD	After intervention Mean±SD	F*	df	P value
Change in mean fall prevention behavior score	5.21 ± 2.09	14.46 ± 4.19	20.73	64	< 0.001

* Analysis of covariance

Discussion

The present research examines how education impacts the fall prevention behaviors of nurses when it comes to elderly patients who are hospitalized. The results indicated that there was a rise in the average score of fall prevention behaviors among nurses after they underwent the fall prevention training program. The initial step towards raising awareness always involves education, and it is crucial to select the most suitable theoretical foundations for educational purposes. Additionally, creating an educational program to decrease the occurrence of falls among inpatients necessitates the sensitization of compassionate nurses. The perception of the benefits and barriers associated with fall prevention interventions can contribute to sensitivity, a comprehension of the situation, and ultimately, changes in health-related behaviors.^[26]

According to the current findings, educational workshops are effective in changing nurses' actions to reduce bed falls in the elderly. This is consistent with the findings of Agua et al., who observed that teaching nurses how to follow multi-factor fall prevention recommendations improves their comprehension and confidence in implementing fall prevention measures in care facilities.^[27] Additionally, Leverenz et al. demonstrated that nurses appreciate training in fall prevention strategies and express a high level of satisfaction with such training. The data they collected also highlighted the connection between fall prevention education and the initial step in building nurses' self-confidence and enhancing their ability to prevent patient falls.^[28] Consistent with the findings of this research, Liu et al. also discovered that implementing educational programs can effectively enhance nurses' understanding of strategies to prevent falls in elderly individuals.^[22] Additionally, other studies have indicated that nurses who have witnessed patient bed falls

have a higher level of awareness compared to those who have not encountered such incidents.^[29,30] This association might be related to the injuries sustained by nurses as a result of patient falls, which made them more attentive and careful when preventing falls among patients.

Nurses' adherence to fall prevention practices can be impacted by a variety of factors, including their training, attitude, and the availability of personnel, the necessary environment, and equipment.^[26] To enhance nurses' performance in fall prevention, it is crucial to not only improve their knowledge and attitude towards these behaviors in elderly patients but also implement multifaceted strategies like reminders, identification systems, auditing, and feedback.^[31] Additionally, having a positive attitude towards these behaviors is a significant factor to consider.^[32,33] Previous studies have demonstrated that providing training and incorporating advanced exercises, along with removing obstacles, can effectively reduce bed falls.^[20,34,35] Moreover, the presence of adequate facilities may also have an influence on overall performance.^[28]

Educational programs for nurses often focus on fall prevention methods, but the causes and effects of falls are given less attention.^[26] Once nurses are trained in fall prevention behaviors, it is important to evaluate the effectiveness of this training in real-world settings. This includes assessing the rate of falls and complications in centers where nurses have received fall prevention training. However, it should be noted that the study on fall prevention behaviors was limited to one general hospital, and further research on a larger population in multiple hospitals is recommended. Additionally, monitoring nurses' fall prevention behaviors over longer periods and at different times is necessary for a more comprehensive understanding of their impact.

Conclusions

The findings of this research indicate that providing training to nurses on fall prevention behaviors can have a positive impact on their implementation of such behaviors when caring for elderly individuals. Given that falls pose significant challenges and expenses for both individuals and healthcare systems, it is advisable to organize and deliver similar training programs nationwide, focusing on behaviors associated with fall prevention in the elderly. This approach aims to enhance nurses' knowledge and skills, ultimately leading to a reduction in falls and their associated complications among patients.

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Competing interests

The authors declare that they have no competing interests.

Abbreviations

Coronavirus disease 2019: COVID-19;
Kuder-Richardson 21: KR21.

Authors' contributions

Study design: HH, MS, BAA, FE, MA. Data collection: MS, BA. Data analysis: HH, MS, FE. Study supervision: HH, MS, BA, FE. Manuscript writing: HH, MS, BA, FE, MA. All authors read and approved the final manuscript. All authors take responsibility for the integrity of the data and the accuracy of the data analysis.

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Availability of data and materials

The data used in this study are available from the corresponding author on request.

Ethics approval and consent to participate

The study was conducted in accordance with the Declaration of Helsinki. The study was approved at the Research Ethics Committee of Lorestan University of Medical Sciences, IR.LUMS.REC.1398.269.

Consent for publication

By submitting this document, the authors declare their consent for the final accepted version of the manuscript to be considered for publication.

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