

Safety Measures for Prevention of Falling in Intensive Care Units in Kirkuk, Iraq: An Observational Study



Alaa Hussein Ali Gydan 1, Hanaa Hussein El-Sayed Ahmed 2, Asmaa Ibrahim Abo Seada 3

1 Demonstrator of Critical Care and Emergency Nursing, Faculty of Nursing, Kirkuk University, Iraq. e-mail: Ala77.h.ali@gmail.com

2 Assist. Prof. of Critical Care and Emergency Nursing, Faculty of Nursing, Mansoura University, Egypt. e-mail: hanatop.99@gmail.com

3 Assist. Prof. of Critical Care and Emergency Nursing, Faculty of Nursing, Mansoura University, Egypt. e-mail: hyn_asmay@yahoo.com

1. ABSTRACT

Background: About 33% of inpatient falls lead to injury, including 4–6% ending in catastrophic injuries (such as fractures) that can lead to co-morbidity and death. Patient falls consider a significant challenge and ongoing issue for acute-care hospitals, long-term care facilities, and community health clinics. **Aim:** The aim of this study is to assess safety measures for prevention of falling in intensive care units. **Method:** This study had descriptive exploratory research design was used in this study, to arrive at complete description and explication with convenience sample of 70 CCNs who have at least one year of work experience in the ICU from two intensive care unit for two hospital of Kirkuk city, Iraq. This study was used one tool for collection data; Safety Measures for Falling Prevention among CIPs, Falling Risk Factors Observational, and CCNs Practices Regarding Safety Measures for Falling Prevention. **Results:** A positive statistical significant correlation was noticed between the studied nurses' age and their assessment of the patient related ($p=0.015$) and organizational and policies related falling risk factors ($p=0.029$). A highly statistical significant positive correlation was depicted between the studied nurses' total mean practice score of risk factors assessment and safety measures for falling prevention ($r=0.419$, $p=0.002$). **Conclusion:** Based on findings the current study indicated that more than half of the study nurses had good practice regarding fall risk assessment and implementing of prevention fall strategies.

Keywords: *Falling prevention, Intensive care unit, Safety measures*

2. Introduction:

Falling is a serious health problem that often leads to serious injuries and even death. Patient falls are also a significant challenge and ongoing problem (Godlock, Christiansen, & Feider, 2016). It is a significant community health crisis all over the world (Kobayashi et al., 2017). It can result in significant rates of morbidity and mortality (Rheume & Fruh, 2015). Patients and institutions are affected by the harmful consequences of falls, which are occur in around 30% to 50% of the cases in the ICUs (Alrubaiee, Baharom, Shahar, Daud, & Basaleem, 2017).

Falling is defined as any negative change in a patient's position that ends in contact with the floor and can result in to patients' injury or loss of consciousness (Brand & Sundararajan, 2010). According to Pokorná, Bůřilová, Štrombachová, and Dolanová (2017) patients falling can be reported by themselves or present witnesses, patients falls are measured in terms of 2.3 to 7 falls per 1000 patient days, according to

international standards. In the United States, this accounts for 700,000 to a million falls per year, more concerning is the estimate that more than 1% (11000) of these falls are fatal each year.

Falls regarding critically ill patients (CIPs) are multifactorial event with many factors. (Bittencourt, Diaz-Montes, Buyya, Rana, & Parashar, 2017; Kang & Song, 2015). These factors include : age, physical status, and medical conditions which lead to weakness. Other factors that most frequently contribute to patient falls are inadequate assessment of patients and lack of implementing safety measures for Critical Intensive Care Patients (CIPs) due to deficiency in staff orientation, supervision and leadership (Alert, 2015). Thereby, CIPs are at higher risk that for fall which is the common cause of serious injuries during their ICU stay (Barker et al., 2016; Ganz et al., 2013).

McKechnie, Pryor, & Fisher (2016) That reported that falls incidence increased with increased its risk factors. Thus, all CIPs should be

screened for falling risks (Lang, T'ng Chang Kwok, LeJeune, & Sharples, 2014). Falling can lead to many complications or consequences among CIPs (Tzeng & Yin, 2014). Unassisted falls inevitably lead to more serious injuries than assisted falls, thus causing greater harm to the patient such as serious fractures or sprains, or even fatal injuries (Groutas & Staggs, 2014).

Falling can be caused by internal or external causes. Internal causes include patient physical, psychological, pharmacotherapy and age related changes (Chang et al., 2011). According to the National Health Services (2007) external causes accounts for 20% to 30% of all falling causes among CIPs. These involve causes environmental, mechanical, technological, organizational and policies causes (Chang et al., 2011; Lamis, Kramer, Hale, Zackula, & Berg, 2012). Another causes for a patient's fall in the ICU is the patients' ability to call for assistance that is influenced by a perception that nurses are too busy (Carroll, Dykes, & Hurley, 2010).

Falls have contributed to major injuries, some resulting in death among CIPs the effects of falls include physical, emotional, and financial consequences (Ambutas, 2017). It can affect nursing management procedure for CIPs and extend ICU stay for these patients (Cox et al., 2015). Also, it can affect CIPs' quality of life in the future (Ganz et al., 2013). Additionally, it can affect the CIPs' mobility confidence and depends (Wong et al., 2011). So, CIPs need appropriate and effective safety preventive measures to avoid falling consequences (Bradley et al., 2010)

2.1 Significance of the Study

Fall prevention is the main concern among healthcare institutions since providing quality and safe care is their primary goal. As healthcare systems continue to adopt and implement fall prevention strategies, nurses play a critical role in implementing fall prevention procedures in the acute care setting (Elbasiony, Basal, Tag El-din, & ShabanAysha, 2021). Some international research studies stated that there are many safety measures used to prevent falls among CIPs using multi-aspects program (Ang,

Mordiffi, & Wong, 2011; Horová, Brabcová, & Krocová, 2017; Luzia, Argenta, Almeida, & Lucena, 2018). Multi-identification of risky patients immediately after ICUs admission is recommended (Hefner, McAlearney, Mansfield, Knupp, & Moffatt-Bruce, 2015). Family members' education, using modern technologies and hospital policies' are updated nursing recommendations to reduce falling incidence in ICUs (Bayen et al., 2017; Cuttler, Barr-Walker, & Cuttler, 2017).

2.2 Aim of the Study

The aim of this study is to assess safety measures for prevention of falling in intensive care units, Kirkuk hospitals, Iraq.

2.3 Research questions

To fulfill the aim of this study, the following research questions are formulated:

- Q₁: What are measures for prevention of falling in intensive care units?
- Q₂: What is the critical care nurse practices level regarding safety measures for prevention of falling?

3. Method

3.1 Design

This study used a descriptive explorative research design. This design is utilized to explore and describe the CCNs' practices regarding safety measures of falling prevention among CIPs. It relies primarily on in-depth clues exploration and description of CIPs' risk factors and CCNs' performance to screen those patients and prevent fall among them. Thereby, it is the curtail design for the present study (Polit & Beck, 2020).

3.2 Setting

This study was conducted in two hospitals: General Kirkuk Hospital and Azadi Teaching Hospital, Kirkuk City, Iraq. Each hospital encompasses one ICU. General Kirkuk Hospital ICU involves 10 beds while Azadi Teaching Hospital encompasses one with 12 beds. Each ICU is well equipped with man powers and advance technologies required for management of CIPs. The nurse patient ratio in each unit is nearly 1:2 in morning shift and 1:3 in other shifts.

3.3 Subjects

A convenience sample of 60 CCNs (all nurses) working in the above mentioned setting who had at least one year of work experience in the ICU, involved in direct care of CIPs with different levels of education and able to participate voluntarily were enrolled in the current study.

3.4 Data Collection Tools

One tool was utilized to collect data of the current study.

Safety Measures for Falling Prevention among Critically Ill Patients Tool:

The tool was developed by the primary researcher (PR) after reviewing pertinent literature Australian commission in Safety and Quality in Health Care. (C. National Patient Safety, 2015; Gu et al., 2016; McKechnie et al., 2016) It was used to collect CCNs' personal data, and to assess CCNs' performance regarding CIPs' falling risk factors and falling preventive measures. It embraces three parts:

Part 1: "Nurses' Demographic Data"

This part was collected the CCNs personal and professional information. It was included nurses' age, gender, level of education, and years of work experience in ICUs attending workshop about falling prevention measures among CIPs.

Part 2: "Falling Risk Factors Observational Checklist"

This was assess CCNs practices regarding CIPs screening for falling risk factors. It was included three main domains: patient related factors, environmental related factors and organizational and policies related factors. Each item was scored as follow: "Done correctly = 2", "Done incorrectly = 1", and "Not done = 0". Three point Likert scale was used to calculate the total score for each domain as follow: "Good practice >75%", "fair practice 50% to 75%" and "poor practice <50%".

Part 3: "CCNs Practices Regarding Safety Measures for Falling Prevention Observational Checklist"

This part was used to assess the CCNs practices regarding falling preventive safety measures among CIPs. It was involved three main domains as follow: on admission patient screening, ongoing preventive falling measures and nursing documentation and follow-up. Each item will be scored as follow: "Done correctly = 2", "Done incorrectly = 1", and "Not done = 0". Three point Likert scale was used to calculate the total score for each domain as follow: "Good practice >75%", "fair practice 50% to 75%" and "poor practice <50%".

Scoring System

Each sub-item or core element of part 2 and 3 was scored as follows: "Done correctly = 2", "Done incorrectly = 1", and "Not done = 0". The three point Liked Scale was used to calculate the total score for each domain. Thereby, the total score of each main domain of CCNs' practices was calculated and scored as follow "Good practice >75%", "fair practice 50% to 75%" and "poor practice <50%" (Elbokhary Osama, & Al-Khader, 2015).

3.5 Validity and Reliability of the Tool

A panel of 5 specialists evaluated the data collection tool's contented validity. Three experts in Critical Care and Emergency Nursing Department, Faculty of Nursing, Mansoura University and two staff members from Anesthesia and Intensive Care, Faculty of Medicine, Mansoura University. The tool was reviewed by the panel for its inclusiveness, simplicity, relevancy, and applicability. Accordingly, the required adjustments were made. The Instrument reliability of the tool was tested using Cronbach Alpha test that revealed $r = 0.89$ which indicates a high reliable tool (Appendix A).

3.6 Pilot Study

A pilot study was approved out on six CCNs (10% of the sample's total). It was conducted to check the applicability, possibility and

clarity of the tool and the required time for each CCN to fill the data collection sheet. Concurrently, the essential adjustments were done. Participant nurses in the pilot study were omitted from the main study sample.

3.7 Ethical Considerations

An ethical approval was granted from the Research Ethics Committee (REC), Faculty of Nursing, Mansoura University. An official approval to conduct the study was acquired from the hospital administrative authority after providing complete clarification of the aim and the nature of the study. Written informed consent was obtained from the participant nurses who was accepted to participate in the study after providing them with the study details and its benefits and risks. They were also informed that their participation is voluntary and they have the right to refuse or withdraw from the study at any time without any effect on their annual appraisal. Moreover, they were assured that their data were be coded and their personal information were be kept confidential.

3.8 Data Collection process

- Data were collected by the PI over a six-month period (between September 2020 and February 2021).
- Before commencing data collection, official permission to conduct the study was obtained from the director of the Mansoura Emergency Hospital after explaining the nature of this study.
- The PI set up a meeting with available nurses working in the selected study setting, explaining the study's aim and nature, and inviting them to participate in this research.
- The PI collected participant nurses' demographic data using part I of the tool. Completing this part lasted about 10 minutes for each nurse.
- Participant nurses' practices regarding CIPs screening for falling risk factors was observed once at the time of the patient's

admission to the ICU using part (2) of the tool.

- Each part taken about 5 to 10 minutes to be filled by the CCN with total time 15 to 30 minutes.
- Each participant nurse performance in (part 2 and 3) was scored as follow: "Good practice >75%", "fair practice 50% to 75%" and "poor practice <50%".
- Relations between the participant nurses' demographic data and their performance were tested.

3.9 Data Analysis

The collected data was coded, computerized and analyzed using the Statistical Package of Social Sciences version 20.0 (SPSS, Chicago, IL). Categorical data were expressed as number and frequency. While continuous data were normally distributed and were expressed as mean \pm standard deviation (SD). Chi-Square test was used to compare variables with categorical data. Correlation coefficient test was used to test for correlations between two variables with continuous data. The findings were considered as statistically significant if the p value ≤ 0.050 .

4. Results

Table 1 summarizes the demographic data of the participant nurses in the studied ICUs. It exhibited that the vast majority (92.6%) of the participant nurses were younger males aged from 18 to 30 years with mean age 24.9 ± 4.4 . As well, the majority of nurses (90.7%) had bachelor's degree and 1 - 5 years of experience in ICU (83.3%) with mean 3.7 ± 1.8 . However, about two-third of them didn't attend any workshop or courses about falling prevention measures among CIPs in the studied ICUs.

Table 2

Clarify the participant nurses' total mean score practice regarding falling risk factors domains. More than half of the studied nurses have good practices regarding the patient related risk factors (59.3%) and the environmental falling risk factors (57.4%)

domains. Nevertheless, 50% of them have good practices in relation of organizational and policies related risk factors domain. However, 57.4% of the participant nurses achieved good practices of total falling risk factors domains.

Table 3 articulate the correlation between participant nurses' demographic data and their total mean score practices of patients' falling risk factors and falling safety preventive measures. A positive statistical significant correlation was noticed between the studied nurses' age and their assessment of the patient related ($p= 0.015$) and organizational and policies related falling risk factors ($p= 0.029$). Additionally, a highly statistical

significant positive correlation was noted between the studied nurses' total mean practice score of risk factors assessment and their age ($p= 0.008$) and years of work experience ($p= 0.002$). Similarly, an extremely statistical significant positive correlation was found between the studied nurses' total mean practice score of safety measures for falling prevention and their age ($p= 0.006$) and years of work experience ($p< 0.0001$). Besides, a highly statistical significant positive correlation was depicted between the studied nurses' total mean practice score of risk factors assessment and safety measures for falling prevention ($r =0.419, p=0.002$)

Table 1 Participant Nurses' Demographic Data

Category	Participant Nurses (n= 54)	
	N	%
Age (Years)		
• 18 – 30	50	92.6
• 31 – 40	4	7.4
Mean ±SD	24.9 ±4.4	
Gender		
• Male	31	57.4
• Female	23	42.6
Qualification		
• Post Graduates	5	9.3
• Bachelor's Nurses	49	90.7
Years of Work Experience		
• 1 – 5	45	83.3
• 6 – 10	9	16.7
Mean ±SD	3.7 ±1.8	
Attending Workshop about Falling Prevention Measures of CIPs		
• Yes	20	37.0
• No	34	63.0

N: Number

SD: Standard Deviation

CIPs: Critically Ill Patients

Table 2 Total Mean Score of Participant Nurses' Practices Regarding Falling Risk Factors Domains

Falling Risk Factors Domains	Participant Nurses' Practices (n= 54)					
	Good Practice (≥75%)		Fair Practice (50 – 75%)		Poor Practice (<50%)	
	N	%	N	%	N	%
• Patient related risk factors	32	59.3	16	29.6	6	11.1
• Environmental related risk factors	31	57.4	19	35.2	4	7.4
• Organizational and policies related risk factors	27	50.0	21	38.9	6	11.1
Total Mean Score Practice	31	57.4	17	31.5	6	11.1

Table 3 Correlation Between Nurses' Demographic Data and their Total Mean Score Practices of Patients' Falling Risk Factors and Falling Safety Preventive Measures

Nurses' Total Mean Score Practices (n=54)	Nurses' Demographic Data (n=54)			
	Age		Years of Work Experience	
	r	p	R	P
Falling Risk Factors Domains				
• Patient related risk factors	0.329	0.015	0.423	0.001
• Environmental related factors	0.139	0.315	0.229	0.096
• Organizational and policies related factors	0.297	0.029	0.135	0.329
Total Risk Factors Domains Score	0.360	0.008	0.409	0.002
Safety Measures for Falling Prevention Domains				
• On admission patient screening preventive falling measures	0.250	0.069	0.398	0.003
• Ongoing preventive falling measures	0.296	0.030	0.249	0.070
• Documentation	0.293	0.031	0.509	0.000
• Follow up	0.065	0.640	0.162	0.242
Total Practices Domains Score	0.372	0.006	0.499	0.000

r: Correlation Coefficient Test

P value: ≤0.05 is significant

5. Discussion

The majority of the participating nurses were younger, between the ages of 18 and 30, according to the study's findings. This may be attributed to conventional work environments and job descriptions that require young nurses to interact directly with CIPs while managerial responsibilities are assigned to older nurses. Furthermore, working in the ICU needs active personnel with critical thinking abilities to learn more skills and have physical fitness. Thus, these qualities will be reflected in the care given to ICU patients which is available among novice bachelor's graduates.

These results are consistent with **Mamdouh, Mohamed, and Abdelatif, (2020)**, who evaluated the nurses' practice in regard to the use of patient safety measures in ICUs at the Ain Shams University hospital and noted that the majority of the enrolled nurses were between the ages of 20 and 30. Additionally, these findings are in line with other recent studies (**Ahmed, Khalil, & Aboseada, 2021; Colombage & Goonewardena, 2020; Fahmy, Ibrahim, & Kandeel, 2021; Khalil, Mohamed, & Sayed, 2021**).

In the contrary these results is dissimilar to an Iraqi study conducted by **Majeed (2017)** to assess ICU nurses performance regarding endotracheal suctioning for adult patients. The author stated that the average age of most participating nurses was between 18 and 45.

This discrepancy may be due to the different society of the study. According to the current study, more than half of the enrolled nurses were males. These findings are in agreement with **Majeed (2017)**, who reported that most of the examined nurses were males. This result was also supported by a Yemeni study regarding nurses' performance of nosocomial infection control measures (**Alrubaiee et al., 2017**).

It might be related to both; Iraqi female nurses' resistance to employment and workplace violence in hospitals (**Rayan, Qurneh, Elayyan, & Baker, 2016**). According to the Iraqi Ministry of Health, due to years of conflict, war, and sanctions, males make up the backbone of the medical field, particularly the nursing field (**WHO, 2013**). On the other hand, these results were inconsistent with other recent studies (**Chinh et al., 2021; Colombage & Goonewardena, 2020; Fahmy et al., 2021; Khalil et al., 2021**). This could be explained by the various study environments and communities, like as females make up the skeleton of the nursing profession in Egypt and Sri Lanka.

The current findings depict that bachelor's degree education accounts for the highest proportion of participant nurses. This findings are in harmony with other Egyptian studies (**El-Gendi, Seung, Abdelsamie, & Feemster, 2017; Fahmy et al., 2021; Mohamed & Elhanafy, 2019**). This could be due to a

national initiative to increase the standard of care provided to CIPs by hiring bachelor's degree holders in ICUs. Health care providers working in ICUs must be highly skilled technically and have a commitment to providing safe patient care.

The current study demonstrated that nearly half of the participating nurses engaged in good practices in relation to the patients screening for falling risk factors. This finding is consistent with that of **Chinh et al. (2021)** study, which showed that 60% of the nurses who participated in the study accurately assessed all assessment-related issues pertaining to the treatment of falls. Additionally, according to **Innab (2022)** research, the majority of the enrolled nurses assessed the fall risk of the patients upon admission.

The lower nurses' falling assessment score may be attributed to a number of variables, including insufficient nurses' knowledge of falls avoidance, insufficient nurse staffing, and high workload. Other contributing concerns include a lack of supportive equipment and poor communication between nurses and other medical staff. Additionally, inadequate supervision and training about safety precautions and fall prevention may lead to a rise the incidence of falls among CIPs.

The recent findings showed that less than two thirds of the study's nurses evaluated patients' neurological impairments and noted any potential pharmaceutical side effects. This result is consistent with **Innab (2022)** research, which showed that most nurses routinely checked on patients' mental health in order to prevent falls. Also, **Shobhana (2019)**, who studied the interactions between neuropsychiatric medications in neuro-critical care units, found that these medications have a significant effect on patients' neurological health and their safety in ICUs (falling incidence).

The current study findings demonstrated that the most participant nurses had good practices score in relation to falling assessment domains. A recent study compared the perceptions of American and Chinese nurses in

relation to falling assessment and practice. The investigators reported that Chinese nurses have a lower score perception concerning falling assessment domains and prevention measures implementation compared with American nurses (**Wang et al., 2020**).

In the current study, a highly significant positive association between the demographic data, including age, years of work experience and training courses, of the enrolled nurses and their overall mean practice score was observed. The overall mean practice score of the enrolled nurses' risk factor assessment and their use of safety precautions for fall prevention also showed a highly significant positive correlation.

In the line of our result, **Alwutaib, Abdulghafour, Afladhli, Malboul, and El-Shazly (2014)**, Noticed that old age is a significant element of lower level of knowledge and practice scores of universal precaution. Furthermore, **Hassan and Ahmed (2012)** noted a statistically significant association between educational attainment and participation in programs and the overall scores of nurses' adherence to safety procedures for administering high-alert drugs.

6. Limitations

This study involved a small size convenience sample and it was only conducted in three ICUs in two hospitals in Kirkuk Iraq. These factors limit the generalizability of the research findings.

7. Conclusion and Recommendation:

Based on findings the current study indicated that more than half of the study nurses had satisfactory or good practice regarding fall risk assessment and implementing of prevention fall strategies. there was statistical significant relation and positive correlation between total practice and total safety measures a regards their demographic characteristics: age, years of work experience and workshop attendance. Moreover, a highly statistical significant positive correlation was depicted between the studied nurses' total mean practice score of risk factors assessment and safety measures for falling prevention. The following

recommendations are suggested nurses need to should be trained to improve nurses performance regarding patient safety measures through acquiring knowledge and through implementing the established standers of care which must be up dated status periodically, hospitals Administrator need to improve ICU safety structure and design and Further research need A similar study should be replicated on a large sample and other place to generalize the findings and required for assessing nurses knowledge for prevention of falling patients in intensive care unit.

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9. Declaration of Conflicting Interests

The authors declared no potential conflicts of interest regarding the research or publication of the article.

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