Effect of an Educational Program about Fall Prevention and Pain Assessment on Nurses' Performance and Critically Ill Patients' Outcome

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Abstract

Background: Fall and pain consider a challenge for nurses in intensive care units because information of them is lacking. **Aim of study:** Evaluate the effect of an educational program about fall prevention and pain assessment on nurses' performance and critically ill patients' outcome. **Design**: A quasi experimental - design was used to accomplish the aim of this study. **Setting:** This study was carried out in general intensive care unit at Benha University Hospital. **Sample**: Convenience sample of all available nurses (65 nurses) who are working in ICU & A purposive sample of 60 patients who attended to ICU within 6 months. **Tools**: The following three data collection tools were used (I) Structured Questionnaire for Nurses. (II) Observational checklist regarding fall prevention and pain assessment. (III) Patients' outcomes assessment sheet. **Results:** The total nurses' knowledge & practice scores regarding fall prevention and pain assessment post educational program implementation were higher than pre implementation. **Conclusion**: The total nurses' knowledge and practice pre and post implementation of educational program are significantly positively correlated. In addition, after two weeks, the study group's patient outcomes improved more than those of the control group, with statistically significant differences at (p 0.05). **Recommendation:** A similar study should be replicated on a large sample and other place to generalize the findings.

Key words: Critical ill patients' outcomes, Fall prevention, Nurses' Performance, and Pain assessment.

Introduction

Falling in hospital is a significant clinical, legal, and regulatory problem, moreover, is considered one of the nursing-sensitive quality indicators and essential goal of international patient safety goals (IPSG). In hospitals, falls are generally understood to be any unintended changes in posture that cause a person to land on the ground, a floor, or another lower surface. Falls are the most frequently reported incidents among hospitalized patients. It is considered a challenge for healthcare workers because information on effective fall reduction is lacking ***(Elbasiony et al., 2021).***

Additionally, it is defined as "unintentional incident in which a patient comes to rest on the floor and can require help by another". There are three types of falls Accidental Falls: This category includes patients who trip, fall, or slip unintentionally. They may have not been identified as a fall risk utilizing the Morse tool. Environmental factors and errors in patient judgment cause these types of falls. Prevention of these types of falls is geared at keeping the environment free from hazards and proper education for the patient/family regarding the environment and use of various devices ***(Duckworth et al., 2019).***

Unanticipated Physiological Falls: includes falls that are linked to physiological causes, such as seizures, that cannot be recognized or foreseen by any prior examination. Although there isn't a genuine way to prevent this kind of fall the first time, if it does happen, measures are put in place to prevent injuries if the incident should occur again ***(Dykes & Hurley, 2021).***

Anticipated Physiological Falls: include falls discovered using a fall risk assessment

tool. Programs for fall prevention are designed to reduce the frequency and severity of these falls. Predictable factors include more than one diagnosis, a previous fall, a weak or impaired gait, the lack of a realistic assessment of his or her own abilities to go to the bathroom unassisted, an IV or saline lock: polypharmacy and an ambulatory aid. Anticipated physiological falls constitute approximately 78% of all falls ***(Heng et al., 2019).***

The Morse Fall Scale (MFS) is a rapid and simple method of assessing a patient's likelihood of falling. The scale is rated as "quick and straightforward to use" by a sizable majority of nurses (82.9%), and 54% believe it takes less than 3 minutes to rate a patient. It consists of six variables that are quick and easy to score, and it has been shown to have predictive validity and interrater reliability. Inpatient long-term care facilities as well as hospitals frequently use the MFS for acute care settings. The risk factors for falls in hospitalized patients can be determined using this tool. It is possible to forecast future falls using the total score, but it is more crucial to use the scale to identify risk factors and then to develop a care plan to address those risk factors. ***(Montero-Odasso et al. 2021).***

By implementing nursing interventions for fall preventions among hospitalized patients, nurses on the health care team can significantly contribute to the provision of evidence-based care and fall prevention approaches. Nurses' education and fall prevention program are both crucial in preventing patient falls. Nurses play a vital role in the safety concerned of the hospitalized patients by frequently assessing and monitoring the patient movement and activities of daily living during their stay in the hospital ***(King et al. 2018).***

Creating nursing intervention plans to prevent falls, a number of nursing-related studies have also been carried out. The definition, incidence, and risk factors of falls, fall risk assessment instruments, and the effect of fall prevention programs have all been studied in detail in systematic literature reviews and meta-analyses, as well as numerous other researches. However, the focus of many systematic literature review studies has been limited to specific areas such as the subjects, variables, environments, and interventions of studies. Thus, many studies could not be included, which limited the derivation of integrated results. Further, since falls are caused by a combination of intrinsic and extrinsic factors, an integrated body of knowledge such as interrelationships of issues and changes and trends over time needs to be utilized in clinical practice **(*Seo et al., 2021)***.

An unpleasant sensory or emotional experience linked to actual or potential tissue damage is referred to as pain physiologically. Another definition of pain is that it is "whatever the experiencing individual says it is, existing whenever he or she says that it does. Everyone is affected by pain, regardless of health status. The critically ill patients normally are characterized to experience pain. In the face of life-threatening injury or illness, pain and its treatment are forgotten, or underappreciated by the health care providers. Pain assessment is said to be at the top level in proper pain relief and an important goal in patients' care. Because pain is one of the main experiences that might keep a patient comfortable, maintaining an optimal degree of comfort for critically ill patients is the universal goal for healthcare providers (***Sedighie et al., 2020).***

Inadequate pain assessment has a negative impact on patient outcomes, including prolonging the length of hospital stay and delaying patient recovery. Nurses serve as patients' advocates; thus, it is crucial for them to appropriately assess and manage patients' perceptions of pain. However, Studies revealed that nurses' attitudes and knowledge of pain are inadequate. Effective pain evaluation and management among nurses has been hampered by several factors, including their lack of knowledge and skills, poor teamwork, heavy workloads, poor nurse-patient communication, and insufficient time. ***(Ou et al., 2021).***

The gold standard of pain assessment given the subjective nature of pain is the self-reporting of the pain. Unsatisfactorily managed acute pain has a negative impact on the physical and psychological consequences as well as

negative impact to many organ systems. Due to these consequences, pain can hinder recovery and have a detrimental influence on morbidity and mortality. For critically ill patients, effective analgesia is vital because of the psychological and physical benefits it provides. ***(Mondol et al., 2018).***

Significance of the study:

Falls are a significant issue in healthcare since they frequently cause catastrophic injuries or even fatalities. The range of patient falls per 1000 patient days used as a benchmark internationally is 2.3 to 7. This is responsible for between 700,000 to 100,000 falls annually in the US. More alarming is the estimate that annually more than 1% (11000) of these falls are fatal. Unassisted falls always result in more severe injuries than assisted falls, which harms the patient more and may result in fatal injuries, significant fractures, or sprains. ***(Elbasiony et al., 2021).***

One of the international patient safety goals is fall prevention, which must be accomplished through care protocols that follow the National Patient Safety Program (PNSP). Even if their impact on the intended outcomes is not instantaneous, the execution of these protocols has demonstrated satisfactory results in preventing this incident. Additionally, they have demonstrated value in lowering the rate of falls, improving the quality of care and reducing hospitalization costs ***(CunhaI et al., 2022).***

For more than 25 years, researchers have been more interested in pain assessment in adult ICU patients. However, among adult ICU patients, pain is still serious health issue that affects people all over the world. Unfortunately, due to numerous obstacles, the pain experienced by adult ICU patients is still largely under recognized and undertreated. Furthermore, there remains a wide gap between the findings of previous research and clinical practice. Moreover, there is no evidence in the nursing literature regarding the barriers and facilitators of pain assessment and management in adult critical care adult patients as perceived by nurses. Therefore, summarizing and synthesizing the existing research on pain assessment and management among adult critical care adult patients is needed to guide clinical practice and future research ***(Rababa et al., 2021).***

This study aimed to evaluate the effect of an educational program about fall prevention and pain assessment on nurses' performance and critically ill patients' outcome.

Research Hypotheses

H1- The total score of nurses' knowledge about fall prevention and pain assessment post educational program implementation would be higher than total nurses' knowledge preprograms implementation.

H2-The total score of nurses' practice about fall prevention and pain assessment post educational program implementation would be higher than total nurses' practice preprogram implementation.

H3- The study group's patient outcomes would be better than those of the control group post educational program implementation.

Subject and Method

Research design

A quasi-experimental research design was utilized to achieve the aim of this study (Pre/post-test for nurses' performance, study /control group for patients' outcome)

Setting

This study was carried out in general intensive care unit at Benha University Hospital, which is located on the second floor and has four rooms and one isolation room. Each room has four distinct beds that are fitted with mechanical ventilators.

Sample

a- Nurses

All available nurses (65) assigned to care for the patients in the ICU, from both genders, were included in the study as a convenience sample. They are willing to participate in the study.

b- Patients

A purposive sample of 60 consecutive eligible patients who received care in the general intensive care unit within 6 months ago. Patients recruited were allocated and classified

into two equal groups, 30 patients (control group) pre- educational program who received routine care by nurses before educational program application and taken for three months. 30 patients (study group) were cared for by nurses who were enrolled in the educational program after the program had ended.

Tools for data collection

The following three tools were used to gather the data for this study**:**

I: Structured Questionnaire for nurses:

It was designed by the researchers through a review of related and recent literature **such as Birhan, (2020), Burns et al., (2020), and Mondol et al., (2018).** It aimed to assess nurses' knowledge about fall prevention and pain assessment in ICU. It contained two parts:

Part1: Concerning personal characteristics of nurses related to their age, gender, marital status, educational Qualification, job title, years of experience in the ICU, and previous attendance of training courses about fall prevention and pain assessment in ICU.

Part 2: This part concerned with nurses' knowledge assessment. It consisted of two parts as follow:

1.Nurses' knowledge about fall prevention in ICU, it included 20 MCQ such fall risk factors, assessment, Morse fall scale, fall prevention methods and nursing care .

2.Nurses' knowledge about pain assessment: it included 11 MCQ as (definition of pain, causes, complications and assessment of pain).

Scoring system for knowledge questions:

The right answers were received one grade and the wrong answers were received zero. These scores were summed-up and converted into a percent score. Total knowledge score: 31 questions equal (100%)

- Score from ≥80% (equal ≥25) was considered satisfactory knowledge.

- Score from < 80% (equal < 25) was considered unsatisfactory knowledge.

II: Observational checklist regarding fall prevention and pain assessment. It was adapted from **Burns et al., (2020); Bonkowski, et al., (2018); Faltas, (2018) ;Mondol et al., (2018) & Tuyishimire, 2017**) and modified to suit the nature of the study .It aimed to assess the nurses' practices related to falls prevention and assessment of pain among critically ill patients and included;

- Nurses' practices regarding fall prevention (23 steps)
- Nurses' practices regarding pain assessment (21steps)

Scoring system of Observational checklist:

Each step done correctly was given one grade and zero grades for each step not done.

The overall score for nurses' practice was 44 steps, (100%), categorized as following:

- Score from ≥80% (equal ≥36) referred to satisfactory level of practice.

- Score from < 80% (equal <36) referred to unsatisfactory level of practice.

Tool III: Patients' outcomes assessment:

The researchers designed this assessment tool in English after studying the pertinent literature. It comprised three parts:

Part 1: Demographic characteristics of patients as age, sex, medical history, diagnosis, past ICU admission and length of hospital stay.

Part 2- Fall's risk assessment scale which adopted from ***Morse et al., (1989).*** It used to predict the likelihood of a fall occurring and composed of six items: history of falling, secondary diagnosis, ambulatory aid, IV/heparin lock, gait/transferring and mental status.

Scoring system:

Low risk ➔ <25
Moderate risk ➔ 25-45
High risk ➔ >45

Part 3: Critical pain assessment scale that include or the Critical-Care Pain Observation Tool (CPOT) adopted from ***Gelinas et al., (2009)*** to assess unconsciousness and critically ill adult patients' behaviors indicators for pain. It composed of four items: facial expression, body movement, muscle tension and compliance with ventilator for intubated patients or vocalization for extubated patient. Each CPOT item was scored from 0 to 2, with a maximum score of 8, it was divided as the following: -

No pain ➔ 0 degree
Mild pain ➔ 1-3 degree
Moderate pain ➔ 4-6 degree
Sever pain ➔ above 6 degrees.

Educational program Booklet

It was developed by the researcher for the purpose of the study based on related literature in the form of Arabic booklet ***(Birhan, 2020, Burns et al, 2020; Bonkowski, et al., 2018; Faltas, 2018; Mondol et al., 2018 & Tuyishimire, 2017))***. The booklet's color printing and photo illustrations added to its clarity and helped nurses understand the information. Both a theoretical and a practical component were included.

Theoretical parts included: definition of fall, Morse scale for fall prevention, causes and risk factors of fall in ICU, definition of pain, symptoms, complication, Critical-Care Pain Observation Tool (CPOT), pain assessment and management among critically ill patients.

Practical parts included: Apply Morse fall scale to assess risk for fall prevention, nursing practices to prevent falls, pain assessment among critically ill patients.

Validity and reliability of tools:

The tools were reviewed by a panel of five experts from medical surgical nursing field at faculty of nursing Benha University to test the relevance, clarity of tools' content, comprehension, understanding and necessary modification was done accordingly.

The researcher used test – retest – methods to test the internal consistency of the tools, by administration of the same tools to the same subjects under similar condition on two different occasions. Testing the reliability of the tools was done through Alpha Cronbachtest.

- Reliability for structured for nurse was (0.966) and for observational checklist was (0.894)
- Reliability for fall risk assessment tool was (0.860) and for critical pain assessment scale was (0.821)

Ethical considerations

- The research approval was obtained from the ethical committee of faculty of nursing Benha University before initiating the study work. The aim of this study was explained to all nurses, and they were reassured that all information was confidential, and it was used only for their benefit and for research purpose.

-Verbal nurses' consent was obtained to participate in the study. Nurses were informed that they were allowed to choose to participate or not in the study and they had the right to withdraw from the study at any time without introducing any reason.

-The relevant of patients were informed about the privacy of their information, nature of the study and the confidentiality of the subject data also the study not harmful of patients.

Pilot study:

A pilot study was conducted on 10% of all nurses (6 nurses) from the total number of nurses (65) to test the clarity and applicability of the tools. The nurses involved in the pilot study were included in the study because there was no modification in tools.

Field work:

Data collection and training sessions took place over a 6-month period, from the beginning of May 2022 to the end of October 2022.The researchers visited ICU department three days per a week for morning and

afternoon shifts to collect data. This was done in four phases.

Assessment phase :

For nurses :

- The researchers interviewed the available nurses in additional room to ICU used to training for doctors and nurses.
- Before collecting data, the researchers informed the participants of the study's purpose and obtained their consent to participate. They then assessed the nurses' knowledge and practice regarding fall prevention and pain assessment.
- First nurses were observed by the researchers using observational checklists to assess their practice regarding falls prevention and assessment of pain. It had taken for 30 minutes for each nurse.
- Then the nurse's structured questionnaire was used to assess their knowledge regarding fall prevention and pain assessment to identify their educational needs. These tools were filled in by the nurses; it had taken about 20-30 minutes to be filled.

For patients :

- The researcher assessed the fall risks and pain severity in the patients (control group) while they were being observed. Every patient was assessed in 30 minutes both at the time of admission and two weeks later; this patient assessment phase took three months.

Planning Phase (educational program development):

- Considering assessment phase findings. Priorities and goals were established. The researchers developed the educational program according to nurses' needs and deficiency to improve their knowledge and practices regarding fall prevention and pain assessment among critically ill patients and improve patient's outcomes accordingly.
- Teaching methods included: lecture followed by discussion for theoretical part, demonstration, and re-demonstration for practice training. Media used included colored printed booklet, pictures, and videos on mobile.
- The head nurse of ICU organized the attendance of nurses with the researchers according to their duties on the day.

Implementation phase :

- -All available nurses in the intensive care unit during the time of data collection and agree to participate in this study was recruited into the study. The researcher gave the educational colored booklet to each nurse immediately after assessment phase.
- Total number of the studied nurses was65 nurses; they were divided into 11 groups. Each group contained six nurses in every session.
- The researcher met every group for four sessions: Two sessions for theory and two sessions for practice. The duration for each session was (35-45 minutes) for theoretical sessions and ranged from (45-60 minutes) for practical sessions.

Orientation to educational sessions and its processes were presented to them. A summary about what has been discussed in the previous session, then the objectives of the new topic using simple Arabic language that suits the nurses ' level of education then discussion, motivation and reinforcement during the sessions were employed to enhance learning. At the last session, the researchers informed them that they will be evaluated immediately.

Evaluation phase:

For nurses - :

Evaluation the effect of the educational program about falls prevention and pain assessment on nurses' performance (knowledge and practice) and comparing the finding of the results between pre and post immediately implementation of the program by using the same data collection tools (utilizing tool I, and tool II)

For patients - :

Using patients' outcome assessment sheet (utilizing tool III), the researchers assessed patients (study group) on admission and after two weeks, this phase took 3 months.

Statistical analysis

The collected data were tabulated and statistically analyzed using an IBM computer and the statistical package for social science (SPSS) advanced statistics, version 25 (SPSS Inc., Chicago, IL). Data were presented using descriptive statistics in the form of frequencies,

percentages. Chi-square test(X2) was used for comparisons between qualitative variables to find out relations. Correlation coefficient (r) was used to test the relation between quantitative data. Statistical significance was:

- P- Value > 0, 05 insignificant
- P-value < 0, 05 was considered significant.
- P- Value < 0,001 was considered highly significant.

Results: -

Table (1) shows the number and percentage distribution of the studied nurses according to their personal characteristics which reveals that, 53.8% of the studied nurses were in the age category 25-<35 years with the mean ± SD33.1 ±7.52, 70.8 % were females and 67.7% were married. In relation to educational qualification, 55.4% had technical nursing institute and 78.5% were staff nurses. Regarding to years of experience,58.5% had experience years from 5-<10 years with the mean ±SD 8.58 ± 4.05 and 75.4 % hadn't attended any training courses related to fall prevention and pain assessment for critically ill patients.

Table (2) illustrates the comparison between nurses' knowledge about preventing falls at pre and post implementation of educational program which reveals that 83.1% of the studied nurses had satisfactory level of knowledge regarding to fall prevention post educational program implementation compared to 32.3% of them pre -educational program implementation.

Table (3) shows the comparison between nurses' knowledge about pain assessment for critically ill patients at pre and post implementation of educational program which illustrates that 100% of the studied nurses had unsatisfactory level of knowledge regarding to pain assessment pre -educational program implementation, while post educational program implementation 89.2% of them had satisfactory level of knowledge.

Fig (1) displays distribution of total nurses' knowledge about fall prevention and pain assessment pre and post educational program implementation which demonstrated that, only 6.0% of the studied nurses had satisfactory level of knowledge pre -educational program implementation, while post implementation, 83.0% of them had satisfactory level of total knowledge about fall prevention and pain assessment for critically care patients.

Table (4) shows the comparison of nurses' practices regarding fall prevention pre and post implementation of educational program which revealed 15.4% of nurses do assess and record causes of fall and treat them per protocol and raise all side rails up for sedated or neurologically altered patient, which improved to 81.5%, and 78.5% respectively post educational program implementation. As regard nurses' practices about post fall follow up, this table shows, preprogram implementation 18.5% of nurses assess patient vital signs and patient response to fall and document circumstances of the fall and the patient assessment in the patient's record which improved post educational program to 78.5%. Also, this table shows that 4.6% of the studied nurses had satisfactory level of total practice regarding fall prevention and post fall follow up pre -program implementation which improved to 72.3% post program implementation with p<0.001.

Table (5) demonstrates the comparison of nurses' practices regarding pain assessment pre and post implementation of educational program which revealed that 16.9% of the studied nurses had satisfactory level of total practices regarding pain assessment for critically care patients. Pre -program implementation which improved to 86.2% post program implementation. Also, there is highly statistically significant differences among all items pre and post educational program implementation at (p≤0.001).

Fig (2) shows the distribution of total nurses' practice pre and post implementation of educational program which demonstrated that, 14.0% of the studied nurses had satisfactory level of practices pre-educational program, while post implementation 79.0% of them had satisfactory level of practice regarding to fall prevention and pain assessment.

Table (6) reveals the correlation between total nurses' knowledge and their practice pre and post implementation of educational program which clarifies that there was a positive correlation with statistically significant between total nurses' knowledge and practice pre and post implementation of educational program where p < 0.05.

Table (7) demonstrates the number and percentage distribution of the studied participants (control and study group) based on their demographic data, demonstrating that 50.0%, 60.0% of the control and study groups, respectively, were between the ages of 51 and 60, with mean SD values of (53.8 6.29 & 53.9 5.80).Regarding gender 50.0%, 53.3% respectively were males, regarding medical history 36.7%, 50.0% of control & study group respectively had hypertension and both the control and study groups, respectively, had histories of prior ICU

admissions at 73.3% and 66.7%. Duration of hospital stay ranged from one to three days with percentage 46.7% & 60.0% respectively No statistically significant differences existed between the control group and the study group..

Table (8) illustrates the comparison of the studied patients (control and study group) regarding to total fall's risk assessment on admission and after two weeks showing that 40.0%, 33.3% respectively of both control and study group were at high risk on admission with no significant difference between them. After two weeks, the control and study groups, respectively, had high risk rates of 43.3% and 16.7%, with a statistically significant difference between the two groups at p 0.05.

Table (9) clarifies the comparison of the studied patients total critical pain assessment score on admission and after two weeks showing that there is no significant difference between them as evidenced by 40.0%, 43.3% of both control and study group respectively had severe pain on admission. While after two weeks 33.3% of the control group and 6.7% of the study group, respectively, had severe pain with statistically significant difference between both groups at $p \leq 0.05$.

Table (1): Number and percentage distribution of the studied nurses according to their personal characteristics. (N=65)

Items	The studied nurses (n=65)	
	N	%
Age (Year)		
< 25	10	15.4
25 - < 35	**35**	**53.8**
35 - < 45	13	20
45-55	7	10.8
Mean ± SD **33.1 ± 7.52**		
Gender		
Male	19	29.2
Female	**46**	**70.8**
Marital Status		
Single	18	27.7
Married	**44**	**67.7**
Divorced	1	1.5
Widowed	2	3.1
Educational Qualification		
diploma in nursing	9	13.8
A technical nursing institute	**36**	**55.4**
A bachelor's degree in nursing	16	24.6
Postgraduate studies	4	6.2
Job title		
Staff Nurse.	**51**	**78.5**
Head Nurse	14	21.5
Experience years in ICU		
< 5	9	13.8
5 - < 10	**38**	**58.5**
10 - < 15	9	13.8
15-< 20	8	12.3
≥ 20	1	1.5
Mean ±SD **8.58 ± 4.05**		
Attended any training course related fall prevention and pain assessment for critically care patients		
Yes	16	24.6
No	**49**	**75.4**

Table (2): Comparison between nurses' knowledge about preventing falls at pre and post implementation of educational program. (N=65)

Nurses' knowledge about preventing falls	The studied sample (n=65)								Chi square test	
	Pre- implementation				Post implementation					
	Correct		Incorrect		Correct		Incorrect		X^2	p-value
	N	%	N	%	N	%	N	%		
Risk factors for falls in intensive care units	27	41.5	38	58.5	57	87.7	8	12.3	30.28	.000**
An interaction between patient risks and environmental hazards	32	49.2	33	50.8	56	86.2	9	13.8	20.26	.000**
Increased hazardous environments increase the risk of falling	22	33.2	43	66.2	52	80	13	20	28.23	.000**
A patient who takes four or more drugs by mouth is at risk	23	35.4	42	64.6	48	73.8	17	26.2	19.39	.000**
Patient who takes psychotropic substances is more likely to fall	25	38.5	40	61.5	51	78.5	14	21.5	21.41	.000**
Fall risk factors include	23	35.4	42	64.6	54	83.1	11	16.9	30.61	.000**
Using the identification bracelet in the spotlight for risky patient	25	38.5	40	61.5	52	80	13	20	23.22	.000**
The assessment of fall risk (history, movement problems, medication, mental state, incontinence)	21	32.3	44	67.7	55	84.6	10	15.4	36.61	.000**
Osteoporosis should be tested or treated.	23	53.4	42	64.6	51	78.5	14	21.5	24.59	.000**
The Morse scale used	31	47.7	34	52.3	55	84.6	10	15.4	19.78	.000**
Patients with impaired mobility	36	55.4	29	44.6	57	87.7	8	12.3	16.66	<0.001
Dealing with a severely confused patient.	39	60	26	40	53	81.5	12	18.5	7.28	.012*
Recommended to prevent the patient from falling.	38	58.5	27	41.5	52	80	13	20	7.07	.013*
Falls prevention programs should include multi-faceted interventions	28	43.1	37	**56.9**	54	83.1	11	16.9	22.32	. <0.001**
Regular review of medications can help prevent a patient's miscarriage	34	52.3	31	47.7	55	84.6	10	15.4	15.71	<0.001**
Nurses are responsible for preventing falls only	51	78.5	14	21.5	65	100	0	0	15.69	<0.001**
If there is a possibility of falling, the nurse must do	33	50.8	32	49.2	58	89.2	7	10.8	22.89	.000**
Total knowledge regarding fall prevention	**Satisfactory ≥80**		**Unsatisfactory <80%**		**Satisfactory ≥80**		**Unsatisfactory <80%**		**34.32**	**.000****
	21	**32.3**	**24**	**67.7**	**54**	**83.1**	**11**	**16.9**		

(*) Statistically significant at p≤0.05. ***(**) highly statistically significant at p≤0.001***

Table (3): Comparison between nurses' knowledge about pain assessment for critically ill patients at pre and post implementation of educational program. (N=65)

Nurses' knowledge about the assessment of pain for critically care patients	The studied sample (N=65)								Chi square test	
	Pre-educational program implementation				Post educational program implementation					
	Correct		Incorrect		Correct		Incorrect		X^2	p-value
	N	%	N	%	N	%	N	%		
Pain can be defined as	6	9.2	59	90.8	65	100	0	0	108.02	000**
Pain causes in intensive care units.	7	10.8	58	89.2	65	100	0	0	104.72	000**
Causes of pain in critical care units	14	21.5	51	78.5	57	87.7	8	12.3	57.38	000**
Complications of the occurrence of pain for critically ill patients	6	9.2	59	90.8	61	93.8	4	6.2	93.16	000**
Scale that used to measure the severity of patients' pain in the ICU	7	10.8	58	89.2	60	92.3	5	7.7	86.51	.000**
The CPOT scale is based on	20	30.8	45	69.2	54	63.1	11	16.9	36.26	.000**
obtaining a self-report of pain using simple questions or validated pain assessment tools	18	27.7	47	72.3	6	93.8	4	6.2	59.66	.000**
Refrain from relying solely on vital signs, when assessing pain in severely ill adult patients,	16	24.6	49	75.4	60	92.3	5	7.7	61.32	.000**
When observing the grimacing facial expression gives the highest result	15	23.1	50	67.9	56	86.2	9	13.8	52.16	.005**
A decrease in CPOT scores may indicate that nursing interventions were effective	14	21.5	51	78.5	60	92.3	5	7.7	66.38	.000**
During laryngeal tube delivery, patients are evaluated the same way with CPOT	20	30.8	45	69.2	62	95.4	3	4.6	58.26	.000**
Total knowledge regarding pain assessment	**Satisfactory ≥80**		**Unsatisfactory <80%**		**Satisfactory ≥80**		**Unsatisfactory <80%**		**104.78**	**.000****
	0	**0**	**65**	**100**	**56**	**89.2**	**7**	**10..8**		

(*) Statistically significant at p<0.05. *(**) highly statistically significant at p<0.01.*

Figure (1): Distribution of total nurses' knowledge about fall prevention and pain assessment pre and post educational program implementation (n=65).

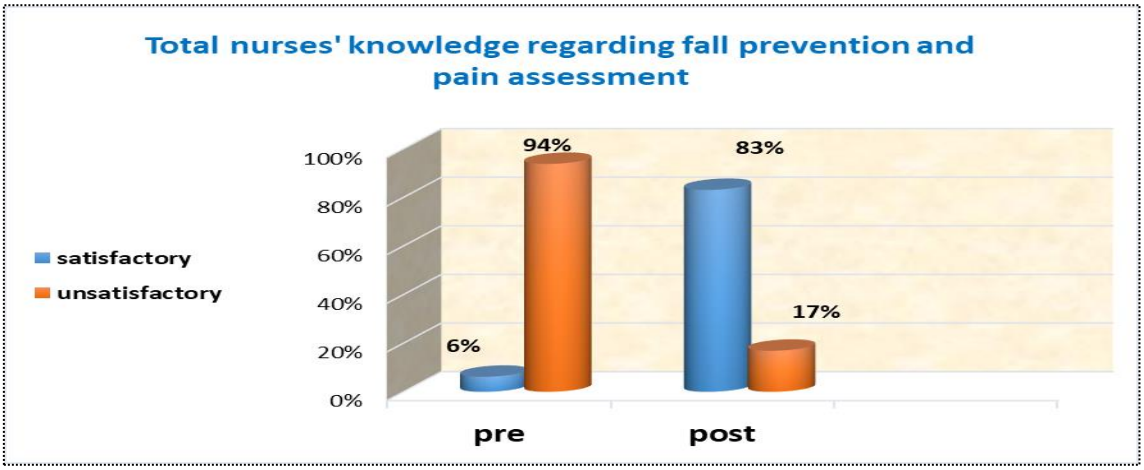

Table (4): Comparison of nurses' practices regarding fall prevention pre and post implementation of educational program. (N=65)

Nurses' practices	The studied sample (n=65)								Chi square test	
	Pre-educational program implementation				Post educational program implementation					
	Done correct		Not done		Done correct		Not done		X^2	p-value
	N	%	N	%	N	%	N	%		
Nurses' practices regarding fall prevention										
Assess and record patient's history of fall on admission	10	15.4	55	84.6	51	87.5	14	21.5	51.9	**0.000****
Set appropriately ECG, invasive arterial line and SpO2 alarms on.	6	9.2	59	90.8	63	96.9	2	3.1	100.34	**0.000****
Assess and record patient's pain assessment and agitation upon admission /start of shift and Q4H	12	18.5	53	81.5	47	72.3	18	27.7	38.01	**0.000****
Assess and record causes of fall and treat them per protocol	**10**	**15.4**	55	84.6	**53**	**81.5**	12	18.5	56.94	**0.000****
Implement bowel routine as soon as there is no contraindication	9	13.8	56	86.2	62	95.4	3	4.6	87.47	0.000
Implement of critical care minimal restraint protocol	13	20	52	80	50	76.9	15	23.1	42.16	0.000
Raise all side rails up for sedated or neurologically altered patient.	**10**	**15.4**	55	84.6	**51**	**78.5**	14	21.5	51.92	0.000
Reorient patient to the surrounding frequently.	10	15.4	55	84.6	62	95.4	3	4.6	84.14	0.000
Daily assessment of invasive lines.	12	18.5	53	81.5	47	72.3	18	27.7	38.01	0.000
Follow safe patient handling practice.	10	15.4	55	84.6	50	76.9	15	23.1	49.52	0.000
Utilize chair alarms based on clinical judgment.	9	13.8	56	86.2	59	90.8	6	9.2	77.08	0.000
Assess patient cognitive ability to utilize a call bell	15	23.1	50	76.9	45	69.2	20	30.8	27.85	0.000
Place the hospital bed in the lowest position in different situations.	12	18.5	53	81.5	46	70.8	19	29.2	35.98	0.000
Nurses' practices regarding fall follow up										
Before relocating the patient after a fall, perform an assessment; any visible injuries must be recorded.	16	24.6	49	75.4	51	78.5	14	21.5	37.72	0.000
Before moving the patient. Call rabid response team and provide spinal immobilization	14	21.5	51	78.5	62	95.4	3	4.6	72.98	0.000
Help the patient get back into bed or a chair by utilizing good body mechanics.	18	27.7	47	72.3	47	72.3	18	27.7	25.87	<0.001.
Assess the patient's vital signs and reaction to falling and document your findings in the patient's file.	**12**	**18.5**	53	81.5	**51**	**78.5**	14	21.5	46.84	0.000
Inform the nurse manager or administrative supervisor of the fall.	14	21.5	51	78.5	47	72.3	18	27.7	33.63	0.000
Inform the family of the fall and any injury.	17	26.2	48	73.8	50	76.9	15	23.1	33.53	0.000
Update safety measures and care plan as needed.	22	33.8	43	66.2	59	90.8	6	9.2	44.84	0.000
Consider implementing a low bed for the patient, If he has fallen.	13	20	52	80	58	89.2	7	10.8	62.84	0.000
Documentation of the fall.	13	20	52	80	25	80	13	20	64.80	0.000
Total practice regarding fall prevention and post fall follow up	**Satisfactory ≥80**		**Unsatisfactory <80%**		**Satisfactory ≥80**		**Unsatisfactory <80%**		**62.92**	**0.000****
	3	**4.6**	**62**	**95.4**	**47**	**72.3**	**18**	**27.7**		

(*) Statistically significant at p<0.05. *(**) highly statistically significant at p<0.001.*

Table (5): Comparison of nurses' practices regarding pain assessment pre and post implementation of educational program. (N=65)

Nurses' practices	The studied sample (n=65)								Chi square test	
	Pre - implementation				Post - implementation					
	Done correct		Not done		Done correct		Not done		X^2	p-value
Wash hands	10	15.4	55	84.6	56	86.2	9	13.8	65.12	0.000**
Provide privacy	19	29.2	46	70.8	56	86.2	9	13.8	43.14	0.000**
Assess patient for the ability to communicate.	22	33.8	43	66.2	54	83.1	11	16.9	32.43	0.000**
Ask the patients who can communicate clearly:	13	33.8	43	66.2	54	83.1	11	16.9	32.43	0.000**
Ask about the patient's ability to sleep.	22	33.8	43	66.2	55	84.6	10	15.4	34.69	0.000**
Ask about previously used interventions for relieving pain	23	35.4	42	64.6	54	83.1	11	16.9	30.61	0.000**
Ask about what triggers pain	10	15.4	55	84.6	51	78.5	14	21.2	51.92	0.000**
Ask what the pain feels like	10	15.4	55	84.6	56	86.2	9	13.8	65.12	0.000**
Ask the patient regarding the pain location.	12	8.5	53	81.5	47	72.3	18	27.7	38.01	0.000**
Ask if the pain increases or decreases at different times of day	10	15.4	55	84.6	53	81.5	12	18.5	56.94	0.000**
Assess for moaning, crying, reduced activity, grimacing, change in usual behavior, abnormal gait, guarding, diaphoresis, nausea, vomiting,	9	13.8	56	86.2	62	95.4	3	4.6	87.17	0.000**
Inspect site of pain for discoloration, swelling, drainage.	13	20	52	80	50	76.9	15	23.1	42.16	0.000**
Use the facility's clinically validated pain assessment tool, ask the patient about pain intensity.	10	15.4	55	84.6	53	81.5	12	18.5	56.94	0.000**
If the patient cannot communicate clearly:	10	15.4	55	84.6	62	95.4	3	4.6	84.17	0.000**
Assess for potential causes of discomfort										
Observing the patient for changes in behavior.	12	18.5	53	81.5	50	76.9	15	23.1	44.52	0.000**
Take the patients vital signs and monitoring for increased blood pressure, respiration, heart rate.	9	13.8	56	86.2	53	81.5	12	18.5	59.69	0.000**
Adjust pain management and interventions.	8	12.3	57	87.7	61	93.8	4	6.2	8675	0.00**
Use a validated pain assessment tool on a regular basis to continue assessing the presence and intensity of pain.	12	18.5	53	81.5	47	72.3	18	27.7	30.01	0.00**
Provide patient/family education.	10	15.4	55	84.6	51	78.5	14	21.5	51.92	0.00**
Provide information for contacting the treating clinicians.	9	13.8	56	86.2	59	90.8	6	9.2	77.08	0.00**
Documentation	16	24.6	49	75.4	58	89.2	7	10.8	55.33	0.000**
Total practice regarding pain assessment for critically care patients.	**Satisfactory ≥80**		**Unsatisfactory <80%**		**Satisfactory ≥80**		**Unsatisfactory <80%**		**62.36**	**0.000****
	11	**16.9**	**54**	**83.1**	**56**	**86.2**	**9**	**13.8**		

(*) Statistically significant at p<0.05 . (**) highly statistically significant at p<0.001.

Figure (2): Distribution of total nurses' practice pre and post implementation of educational program (n=65).

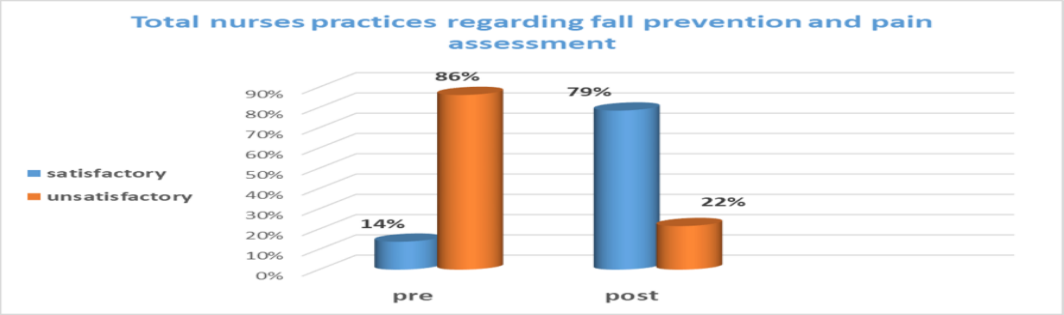

Table (6): Correlation between total nurses' knowledge and their practice pre and post implementation of educational program (N=65).

Variables	Total nurses' practice			
	Pre -educational program		Post educational program	
	R	P	r	p
Total nurses' knowledge	0.222	**0.076***	0.632	**0.062***

(*) Statistically significant at p<0.05.

Table (7): Number and percentage distribution of the studied patients (control and study group) according to their demographic data.

Socio-Demographic Data	Control group (n=30)		Study group (n=30)		Test of Sig.	
	N	%	N	%	X^2	P-value
Age (year)					**.732**	**.866**
30 – 40	3	10	2	6.7		
41 – 50	3	10	2	6.7		
51 – 60	**15**	**50**	**18**	**60**		
>60	9	30	8	26.7		
Mean SD	53.8±**6.29**		53.9±**5.80**		**t=.064**	**.577**
Gender					**.796**	**.500**
Male	**15**	**50**	**16**	**53.3**		
Female	15	50	14	46.7		
Medical history					**2.032**	**.730**
Diabetes mellitus	10	33.3	7	23.3		
Hypertension	**11**	**36.7**	**15**	**50**		
Kidney disease	4	13.3	3	10		
hepatic disease	3	10	2	6.7		
Cardiac disease	2	6.7	3	3		
Diagnosis					**1.122**	**.952**
Respiratory failure	**8**	**26.7**	**8**	**26.7**		
Brain tumor	4	13.3	4	13.3		
Poly-trauma	3	10	2	6.7		

Heart failure	5	10.7	3	10		
Brain Hemorrhage	**8**	**26.7**	**10**	**33.3**		
Diabetic ketoacidosis	2	6.7	3	10		
Previous ICU admission	**22**	**73.3**	**20**	**66.7**	**.317**	**.779**
Duration of hospital stay (Day)					**1.120**	**.571**
New admission	10	33.3	7	23.3		
1-3 days	14	46.7	18	60		
4-7 days	6	20	5	16.7		

No significant at p >0.05.

Table (8) Comparison of the studied patients (control and study group) regarding to total fall's risk assessment score on admission and after two weeks.

Total fall's risk assessment	Control group (n=30)				Study group (n=30)				Test of Sig. (p1)	Test of Sig. (p2)
	On admission		After two weeks		On admission		After two weeks			
	N	%	N	%	N	%	N	%		
Low risk	**5**	**16.7**	**7**	**23.3**	**7**	**23.3**	**11**	**36.7**		
Moderate risk	**13**	**43.3**	**10**	**33.3**	**13**	**43.3**	**14**	**46.7**	**X2=0.515**	**X2=5.111**
High risk	**12**	**40**	**13**	**43.3**	**10**	**33.3**	**5**	**16.7**	**P=0.773**	**P=.0.078***

X^2: Chi-square p= p-value

X^2_1 (P_1): p value for comparing between the (Control group and Study group) on admission.

X^2_2 (P_2): p value for comparing between the (Control group and Study group) after two weeks.

*: statistically significant at $p \leq 0.05$. No significant at p >0.05.

Table (9): Comparison of the studied patients (control and study group) regarding to total critical pain assessment score on admission and after two weeks.

Total critical pain assessment scale	Control group (n=30)				Study group (n=30)				Test of Sig. (p1)	Test of Sig. (p2)
	On admission		After two weeks		On admission		After two weeks			
	N	%	N	%	N	%	N	%		
No pain	**4**	**13.3**	**3**	**10**	**3**	**10**	**5**	**16.7**		
Mild pain	**3**	**10**	**5**	**16.7**	**4**	**13.3**	**8**	**26.7**		
Moderate pain	**11**	**36.7**	**12**	**40**	**10**	**33.3**	**15**	**50**	**X2= 0.373**	**X2= 6.859**
Severe pain	**12**	**40**	**10**	**33.3**	**13**	**43.3**	**2**	**6.7**	**p=0.946**	**P=0.077***

X^2: Chi-square p= p-value

X^2_1 (P_1): p value for comparing between the (Control group and Study group) on admission.

X^2_2 (P_2): p value for comparing between the (Control group and Study group) after two weeks.

*: statistically significant at $p \leq 0.05$. No significant at p >0.05.

Discussion

This study aimed to evaluate the effect of educational program about fall prevention and pain assessment on nurses' performance and critically ill patients' outcome. To fulfilled this, aim the finding discussed through the following parts; (1) nurses' knowledge about fall prevention and pain assessment among critical patients. (2) nurses' practices related to fall prevention and pain assessment among critical patients. (3) Correlation between total nurses' knowledge and their practice pre and post implementation of educational program. (4) Patients ' outcomes related to fall prevention and pain assessment.

Regarding nurses' knowledge about preventing falls at pre and post implementation of educational program. The current study shows most of the studied nurses had satisfactory level of knowledge regarding to fall prevention post educational program implementation at ($p \leq 0.001$). This might be as a result of the program's content's simplicity, clarity, focus on the needs of nurses, and applicability to their field of work. This finding is similar to study done by ***Elbasiony et al., (2021)*** entitled " Effect of Implementing Fall Prevention Strategies on Nurses' Performance at Neurological Diseases Intensive Care Unit " discovered that implementing the educational program caused considerable improvements in nurses' knowledge with a good level of knowledge immediately and one-month after program implementation in the studied group.

This finding in consistence with ***Park, (2021)*** in his study entitled " Development and effect of a fall prevention program based on King's theory of goal attainment in long-term care hospitals: an experimental study" reported that nurse's knowledge regarding fall prevention improved after implementation of theory.

Regarding nurses' knowledge about pain assessment for critically ill patients at pre and post educational program implementation. The findings of the current study indicated that after the implementation of educational program, most studied nurses had satisfactory level of knowledge with variations in all knowledge items between the pre and post educational program implementation periods that are highly statistically significant ($p \leq 0.001$).

The low level of nurses' knowledge preprogram may be due to lack of pain education in nursing curriculum, as well as most patient at ICU were comatose and on mechanical ventilation that in turn lead to nurses' negligence toward pain assessment and management.

This finding consistence with, ***Birhan, (2020)*** conducted study entitled "The practice of nurses and associated factors towards pain assessment in critically ill adult patients" documented that two third of nurses lacked sufficient knowledge of the behaviours that critically sick patients exhibit when in pain. Furthermore, this is corroborated by a study done by ***D'emeh et al., (2016)*** entitled" Pain-related knowledge and barriers among Jordanian nurses: A national study "who found that, Jordanian nurses in this study demonstrated deficits in their level of knowledge regarding pain assessment and management.

On the other hand, this finding is in opposition to ***Mondol et al., (2018)*** who study was about " Nurses' knowledge and practices related to pain assessment in critically ill patients in a selected private hospital in Bangladesh " founded that majority of the participants had a sufficient knowledge about pain assessment and more than half of the them were utilizing a pain assessment tool.

Concerning total nurses' knowledge at pre and post implementation of educational program , The current study result reveals that the mean score of total knowledge was increased post program implementation than pre implementation. Also, there were highly statistically significance difference between all items of knowledge at $p \leq 0.001$.

This study's findings are consistent with study done by ***Samad et al., (2019)*** entitled " Effect of training program on nurses' performance regarding care for patients under mechanical ventilator in intensive care units "

which found a significant difference in the overall nurse knowledge score throughout the study. The current study's findings also show that the majority of the nurses who participated in the study had a good level of overall knowledge about fall prevention and pain assessment for critically ill patients post educational program implementation.

From the researcher point of view, the majority of the studied nurses were not trained about fall prevention and pain assessment, and the inactivation of the in-service education department may also be to blame for the lack of patient education courses and the unsatisfactory level of knowledge pre-program implementation .This result in agreement with ***Ismail & Ismail, (2020)*** in study about " Effectiveness of planned teaching program on knowledge and practice of endotracheal suctioning among staff nurses in selected hospitals of Mangalore" which showed that the mean score of total knowledge increased after the implementation of the guidelines compared to before. Moreover, all knowledge items showed high statistically significant differences at $p \leq 0.001$

Related to nurses' practices regarding fall prevention at pre and post educational program implementation. The current study displays that, that minority of the studied nurses had satisfactory level of total practice regarding fall prevention and post fall follow up pre - program implementation which improved to include most of them post program implementation with $p<0.001$.

The study's findings are also in line with those of ***Elbasiony et al., (2021)*** who stated that the nurses' practices at the pre implementation of the program was unsatisfied. While post-program nurses 'practice was satisfied regarding fall prevention immediately and after one month. The improvement of nurses' practice is a result of implementing an educational program as well.

Also, this is in line with ***Faltas, (2018)*** who conducted a study to evaluate the effect of nurses' guideline on performance of nurses regarding prevention of patients' fall in intensive care units and reported that more than half of nurses had unsatisfactory level of practice pre implementation of nursing guidelines which improved significantly post implementing the nursing guideline.

Related to nurses' practices regarding pain assessment pre and post implementation of educational program. It reveals that. of the studied nurses had satisfactory level of total practices regarding pain assessment for critically care patients. Pre -program implementation. However, more than three quarters of them had satisfactory level of total practices with highly statistically significant differences among all items of practices pre and post educational program implementation at $p \leq 0.001$.

This might be because there aren't any standards or criteria for assessing and managing pain in critically ill adult patients. Also, the fact that having sufficient knowledge is a prerequisite for practicing effectively, hence nurses who lack sufficient knowledge practice inadequately.

These results in the same line with ***Bonkowski et al., (2018)*** who studied " Evaluation of a pain management education program and operational guideline on nursing practice, attitudes, and pain management " stated that there was a statistically significant difference before and after an educational program regarding total nurses' practice scores of pain assessment & management.

Relation to total nurses' practice pre and post implementation of educational program. It demonstrates that, the minority of the studied nurses had satisfactory level of practices pre-educational program, while post implementation the majority of them had satisfactory level of practice regarding to fall prevention and pain assessment.

This is supported by ***Abdelmoaty et al., (2020)*** who conduct their study to evaluate effect of training on nurses' knowledge and skills and found a highly statistically significant difference between levels of acquired nurses' practices pre/post the interactive training. Moreover, this finding agrees with ***Mahmoud et al., (2020)*** who concluded that there was a

statistically significant difference between the total nurses' practice scores before and after an educational program for patient on mechanical ventilation.

This study's findings are consistent with those of ***Samad et al. (2019),*** who found a highly statistically significant difference between nurses' practices before and after the training program. Nonetheless, it is important to note that patient safety comes first. ICU patients on mechanical ventilation need to be observed and monitored constantly.

The third part of discussion was correlation between total nurses' knowledge and their practice pre and post implementation of educational program. The current study showed that, with a p-value of 0.05, there was a strong positive correlation between all nurses' knowledge and their practice before and after an educational program implementation. This finding suggested that practice may be enhanced, particularly if it was connected to relevant scientific knowledge.

From the researcher point of view these results may be attributed to the effect of the application of the educational program and gaining of knowledge that leads to a more comprehensive understanding for the nurses about fall, its risks, and the importance of maintaining patients' safety which had an impact on their behavior patterns and positively affected their performance and compliance. Similarly, the study result is agreement with the ***Elbasiony et al., (2021)*** who reported that a positive correlation relationship between the total knowledge score, total performance, and total compliance score of the studied nurses.

The fourth part of the discussion was Patients' outcomes. Regarding demographic characteristics of studied patients, the current study reveals that nearly two fifths of both controls & study group at age group from 51->60 years old with mean of age 54.3 ± 10.8 & 53.7 ± 9.81, respectively with not statistically significance difference between control and study group. From the researcher point of view, this may be because patients in this age group frequently experience respiratory and cardiovascular disorders or infections, which have a negative impact on patient state and necessitate ICU admission. This result supported by **Mohamed & Ibraheem, (2019)** who studied " Effect of Preventive Bundle Care on Nurses' Knowledge, Compliance and Patients' Outcome Regarding Pressure Ulcer in the Intensive Care Unit " documented that more than half of the control and study group in the age category between 50-<60.

Regarding gender of the studied patients' groups, the current study revealed more than half of the studied patients (study and control group) were males. This result is consistent with ***Ismail & Ismail, (2020)*** who reported that more than half of the studied patients (study and control group) were male. This result disagrees with ***Mayhob & Amin, (2022)*** in study about " Fall Prevention Interventions: Tailored Approach versus Routine Interventions among Elderly Hospitalized Patients " who illustrated that around fifty percent of the studied sample in the study and control groups was female. Regarding the age in both the study and control groups the participants' mean age were 67.5 ± 3.64 and 67.8 ± 4.62.

Concerning medical history, the current study reveals that two fifths of control group and one third of study group had hypertension. This could be because two-fifths of the control and study groups were between the ages of 51 and 60, when most Egyptians experience chronic diseases like hypertension and diabetes mellitus. This could also be because these conditions are among the most prevalent illnesses reported globally, in both developed and developing countries. Moreover, ***Mohamed & Ibraheem (2019)*** observed that both the control and study group's patients had hypertension in more than one quarter of cases.

Regarding diagnosis, the present study demonstrates that more than one fourth of the control and study groups had a brain hemorrhage diagnosis. This could be as a result of their hypertension, which is the main contributor to brain hemorrhage & stroke. Furthermore, the current study shows that there were no statistically significant differences between the control and study groups in terms of sociodemographic information and medical history ($p > 0.05$), indicating that the two

groups were nearly homogenous. This result is consistent with ***Ismail & Ismail, (2020)*** who reported that more than one-quarter of control &study groups were diagnosed with a brain hemorrhage. This finding is in the line with ***Sean, (2018)*** who studied " Guide to infection control in the hospital " reported that more than one-quarter of the control &study group were diagnosed with brain hemorrhage and stroke.

Regarding to total fall's risk assessment on admission and after two weeks. The study clarifies there was no significant difference between study and control group on admission as evidenced by two fifth of both control and study group were at high risk. While after two weeks nearly half and less than one-third of control and study group were at high risk with statistically significant difference between both groups at $p \leq 0.05$.

These findings concured with ***Montejano-Lozoya et al., (2020)*** who study about " Impact of nurses' intervention in the prevention of falls in hospitalized patients" found that, the systematic assessment of the risk of a patient falling during the hospital processes has proven to be a successful intervention to lower the incidence of falls, particularly in the elderly, who experience the greatest number of falls. As a result, it is essential to implement specialized advanced training for all nurses, rather than as a program of voluntary training. The evidence for clinical procedures to guarantee patient safety (such as reducing fall risk) needs to be strengthened, particularly with experimental studies.

This result was in the same line with ***Ismail & Ismail, (2020)*** who stated that there was no significant difference between study and control group on admission as evidenced by less than half of both the control and study groups were at moderate risk. While after two weeks, one-fifth and two-fifth, respectively of the control and study group were at low risk with a highly statistically significant difference between both groups at $p \leq 0.001$.

Regarding to total critical pain assessment score on admission and after two weeks. The study revealed that there was no significant difference study and control group while as two fifth of both control and study group had severe pain on admission .While after two weeks nearly half and less than one-third of control and study group had severe pain with statistically significant difference between both groups at $p \leq 0.05$.

This result agrees with ***Georgiou et al., (2019)*** in his study entitled "The effectiveness of systematic pain assessment on critically ill patient outcomes: A randomized controlled trial" which found that the intervention group's incidence of pain was significantly lower than the control group's ($p < .001$.) in terms of total critical pain assessment scale.

Conclusion

In the light of the study findings, it might be concluded that the total nurses' knowledge about fall prevention and pain assessment post educational program implementation were higher than pre implementation. Also the total nurses' practice about fall prevention and pain assessment post educational program implementation were higher than pre implementation. In relation to the patients' outcomes, the study group's patient outcomes were better than those of the control group post educational program implementation.

Recommendation

- Standard nursing procedures booklets should be available and developed in areas of patients' safety in both Arabic and English languages.
- Posters and simple illustrations about fall prevention and pain assessment should be available in every intensive care unit.
- A similar study should be replicated on a large sample and other place to generalize the findings.

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